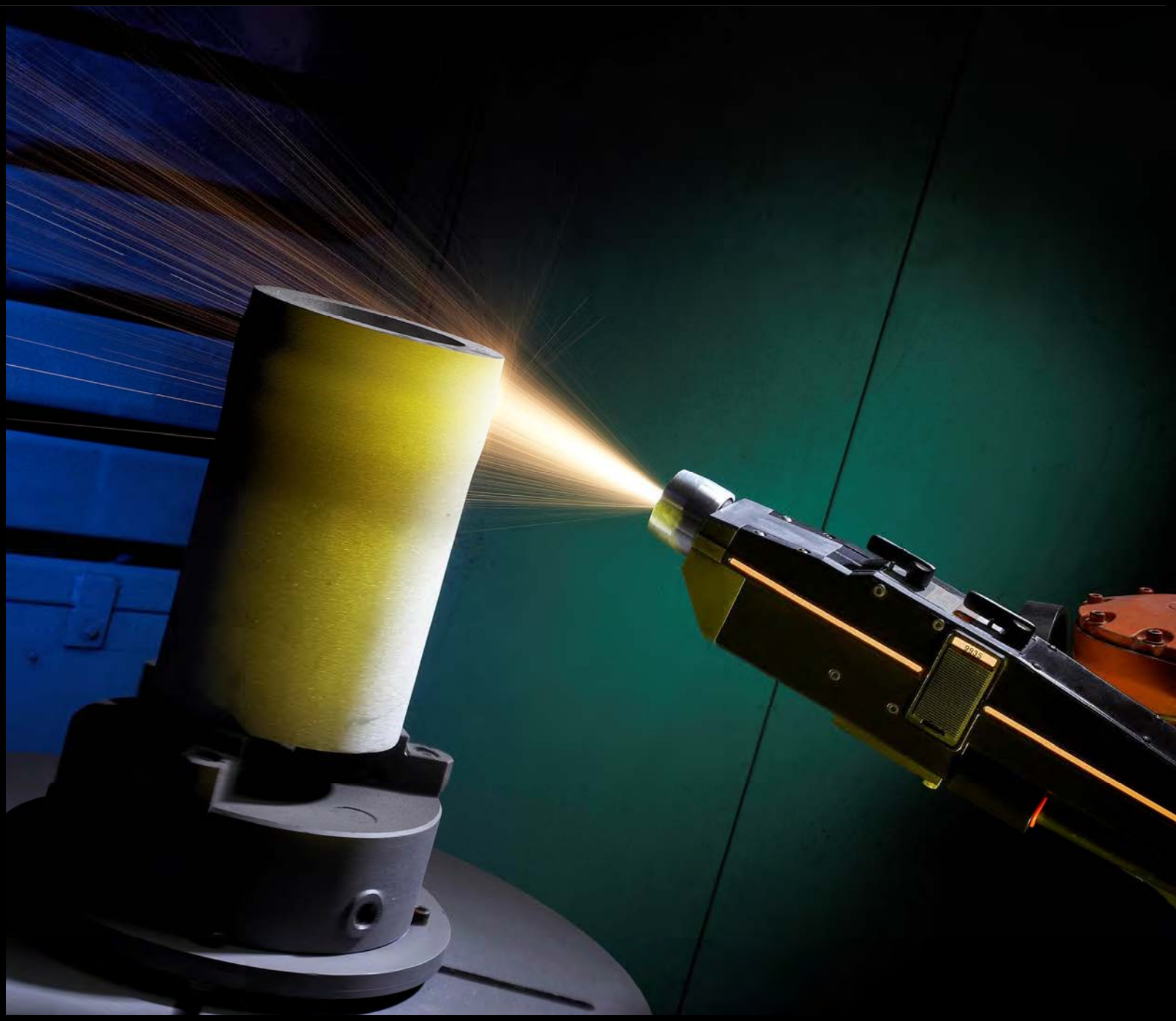
PRAXAIR
SURFACE TECHNOLOGIES

Arc Spray Equipment Solutions



TAFA

Praxair Surface Technologies, Inc. is a **world leader** in thermal spray equipment, materials, and in coatings technology. Our focus is on providing the right **coatings solution** for any application. As a primary contributor to the development and commercialization of the arc spray process, Praxair continues to lead in advancing the technology. Arc spray is at the core of what we do every day, and we provide a complete **family of products** that reflects years of application knowledge with our history of equipment engineering and **coatings expertise.**

As with any process, the selection of arc spray equipment is only the first step. At Praxair we believe that the development of **arc spray wires,** in addition to focusing on **application technology,** pushes the thermal spray process toward expansion into new areas of surface-enhancement solutions. We have dedicated teams of engineers to work with you to **develop solutions** that expand the market for cost-effective thermal spray applications. Let us work with you to select **the best arc spray system** and then help you maximize your output and returns.

For more information, please contact your local representative or contact our U.S. headquarters:

Phone: 1-603-223-2100
Fax: 1-603-225-4342
E-mail: psti-info@praxair.com
www.praxairsurfacetechnologies.com

The arc spray process is used in multiple industries for many demanding applications including some in the aerospace industry.

A long history
of proven success

Proven

The arc spray process is at the very core of Praxair Surface Technologies broad line of thermal spray equipment. This is because of Praxair's historic development and pioneering of applications focused on the arc spray process and our commitment to equipment design and commercialization. We provide a complete family of arc spray products, each using tailored technologies for various coating solutions. The range stretches from "push" to "pull" to "push/pull" wire-feed technologies and to innovative process enhancements like Internal Diameter (ID) spray extensions and *ArcJet*® spray attachment. In addition, we offer a variety of configurations that will support the most demanding applications.

Arc spray models

8830MHU

A true classic of the arc spray line which features an air-driven "pull" 350-amp gun and a simple to use control that has modular unbundled capability. The 8830MHU has become a proven economical and reliable standard of excellence with thousands of applications worldwide.

8835MHU

Adaptable to any spray environment, the 8835MHU features an electric motor "pull" 350-amp gun and modular unbundled control technology. The PLC controls can be used in either automatic or manual mode, and the gun is flexible enough to be handheld or robotically mounted.

BP400

A versatile robust option, the BP400 features a lightweight point-and-shoot gun utilizing "push" wire feed technology. Designed with a 400-amp output, the system provides both application and production flexibility with superior coating results.

CoArc™ system

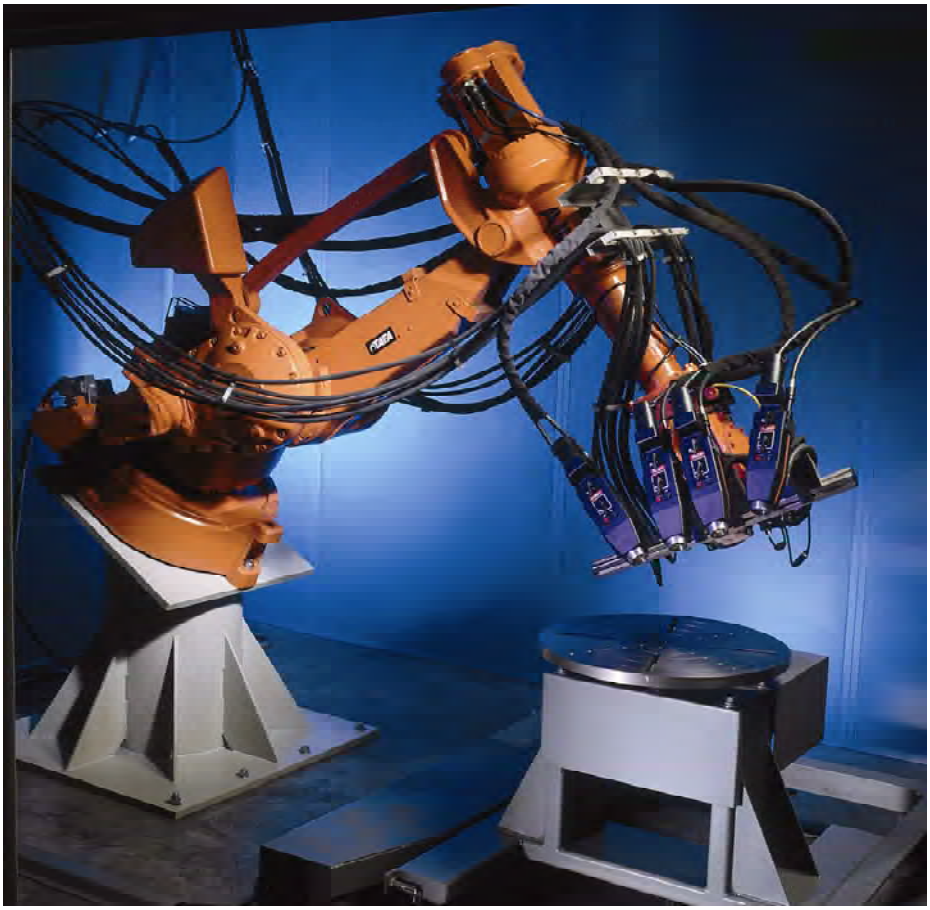
A combination of the best features in TAFA products, the CoArc system features the 9935 350-amp gun combining the robust 8835-type drive with high air flow capability and a "pull" or "push/pull" wire delivery system. Designed with a variety of "state-of-the-art" features and options, it revolutionizes arc spraying by using sophisticated control technology to close-loop the spray process.

The 9935 is a robust, machine mounted or hand-held gun combining the proven, rugged wire drive of the 8835, with a reliable DC servo motor, the high volume air flow capability of the 9000 with a new improved nozzle design to truly make the 9935 the state-of-the-art arc spray gun.

Robust spray systems

Versatility

Our engineering team integrates thermal spray automation, such as this robot-mounted multiple gun arc spray configuration developed for a large automotive OEM.

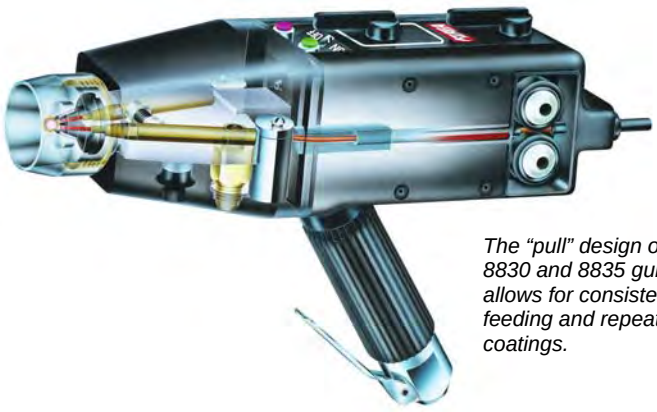


Praxair has modeled equipment strategies around reliability and versatility in use, operation and application. The arc spray process itself provides the best combination of reliability and versatility of all thermal spray processes, and the 8830MHU and 8835MHU have a reputation for great performance and reliable operation in thousands of applications through the years. The guns are designed to perform with minimum operator adjustment, assuring quality coatings time and time again. Process set-up includes only loading wire, setting the voltage, and pushing the “On” button. No other adjustments are needed.

The 8835MHU offers the same properties as the 8830MHU, including the versatility of modular design. Both can be unbundled – the console and the wire feed cart can be separated from the power supply to add more range of use. The 8835’s PLC controls are designed for hand or robotic operation and provide consistently repeatable coatings through a multitude of application and control options.

8830 and 8835 features

- “Pull” wire feed design utilizing either an air drive (8830) or electric drive (8835) with:
  - Optimum energy transfer tip/tube assembly
  - Error-proof alignment housing
  - Permanent arc shield protection
- Double yoke wire feed unit
- 400-amp 100% duty cycle power supply

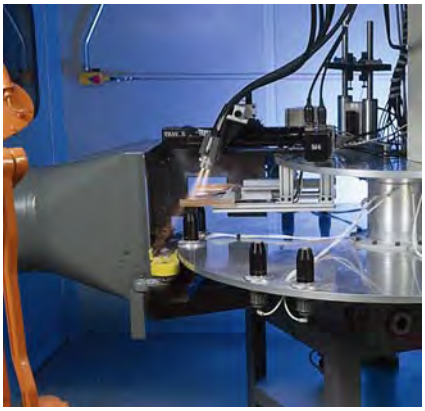


The “pull” design of the 8830 and 8835 guns allows for consistent wire feeding and repeatable coatings.

Dependable
and consistent

Reliability

The flexibility of the BP400 is such that it can function in hand-held or fully automated configurations in applications such as spraying varistors.



Designed with reliability, robustness and flexibility in mind, the BP400 can handle a variety of applications without compromising coating quality. Lightweight, portable and easy to use, the BP400 offers one-touch, point-and-shoot operation. Based on a highly engineered “push” wire delivery system, the BP400 virtually eliminates drive mechanism maintenance. This leads to lightweight gun design, fewer worries, and reliable operation.

BP400 features

- “Push” wire feed design
- Lightweight gun with no moving parts
- Synchronous dual wire feeding
- 400-amp 100% duty cycle power supply
- Handheld or machine mounted

Offering all the benefits of the other arc spray models plus much more, the 9935 gun when used with the *CoArc*™ system provide modularity, and robustness. Advanced controls make the *CoArc* system the ultimate in flexibility and ease-of-use. The *CoArc* system has the option of supplying the wire with “push/pull” technology and when combined with the optional closed-loop control of gun head’s voltage and air pressure, truly revolutionizing the arc spray process to ensure consistent, reproducible coating quality.

CoArc system features

- “Touch-screen operator interface
- Monitoring of spray head voltage and air pressure
- Recipe storage
- Simple, modular design
- 400-amp 100% duty cycle power supply

Simple to operate yet robust, the BP400 arc spray system produces high-quality metallic coatings.

The CoArc system is designed for automated spraying yet offers optional hand spraying capability. The 9935 gun incorporates high-flow air design that when combined with the optional closed-loop control feature ensures consistent, reproducible coating quality.

Arc spray solutions for excellent coatings

Equipment solutions

8830MHU

A proven, reliable and economical arc spray classic

Features:

- "Pull" wire feed design
- Air motor driven
- 1.6mm or 2mm wire feed capability
- Robust construction
- Rated for operation up to 350 amps
- Designed for handheld operations
- CE, UL and 3C certified

8830MHU system components and options

- 400-amp power supply
- 8830MHU control console
- 8830 gun
- Modular, unbundled construction
- Optional *ArcJet*® attachment
- Optional anti-skid retrofit kit
- Optional ID extension for straight-ahead or angled spray

8830MHU system

8835MHU

An easy-to-operate, robust arc spray system designed for maximum application flexibility

Features:

- "Pull" wire feed design
- Electric motor driven
- 1.6mm or 2mm wire feed capability
- PLC controlled
- Built-in E-stop interface
- Rated for operation up to 350 amps
- Designed for automated operations
- CE, UL and 3C certified

8835MHU system components and options

- 400-amp power supply
- 8835MHU control console
- 8835 gun
- Built with *ArcJet*® attachment
- Modular, unbundled construction
- Optional anti-skid retrofit kit
- Optional fan-spray air cap
- Optional ID extension for straight-ahead or angled spray
- Optional robot gun mount

8835MHU system

BP400

Simple, lightweight, and durable arc spray system with a proven track record

Features:

- “Push” wire feed design
- 1.6mm 2mm 2.3mm 3.2mmwire feed capability
- Rated for operation up to 400 amps
- Simple construction
- Designed for handheld or machine-mounted operation
- CE, UL and 3C certified

BP 400 system components and options

- 400-amp power supply
- PF400R control console
- BP400 gun
- Optional high-velocity conversion kit
- Optional fan spray conversion kit
- Optional 2.3mm conversion kit
- Optional ID extension for straight-ahead or angled spray
- Optional robot gun mount

BP 400 system

CoArc™

High-tech, modular arc spray system with advanced control features for reproducible and exceptional coating quality

Features:

- “Pull” wire feed design
- 1.6mm or 2mm wire feed capability
- PLC controlled
- Rated for operation up to 350 amps
- “Touch-screen” operator interface
- Spray head monitoring of voltage and air pressure
- CE, UL and 3C certified

CoArc system components and options

- 400-amp power supply
- *CoArc* control console
- 9935 gun
- Recipe storage
- Maintenance scheduling
- Optional “push/pull” wire feed
- Optional closed-loop control of head voltage and pressure
- Optional wire counter / “out” indicator
- Optional data acquisition capability
- Optional remote OIT / unbundled capability
- Optional 8830 capability

CoArc system

Broad spectrum of wire applications

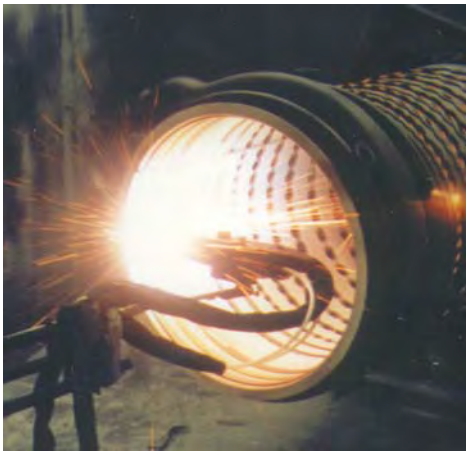
Diversity

Proud of our role in the emergence and growth of the arc spray process, we continue to develop and refine not only equipment and consumables but also arc spray applications. Arc spray coatings are becoming more and more accepted in applications around the world due to the quality, low cost, ease of use, and repeatability of the process.

Praxair has worked closely with industry to develop arc spray solutions for some of the most demanding coating applications. While most arc spray coatings still utilize metallic alloy compositions, the advent and growth of engineered, composite cored wires broadens the use of arc spray technology. For coatings ranging from simple dimensional restoration, to engineered solutions for complex surface treatment requirements, arc spray provides competitive, high quality answers to problems.

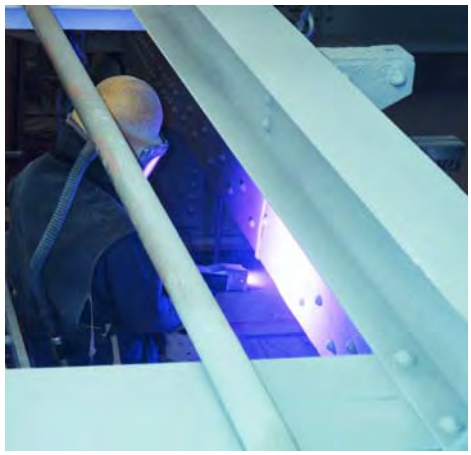
Aircraft component repair

Most major aircraft engine manufacturers specify the use of the arc spray process for repairs of many aircraft engine components. Coatings are applied to various components for dimensional restoration, hot temperature erosion resistance, and as bond coats.



Wear resistance

Cored wire technology has broadened the spectrum of arc spray applications. With a tailored chemistry of cored wires, including carbide-bearing compositions, it is possible to produce coatings with excellent sliding wear resistance as well as abrasion resistance.



Corrosion protection

Arc sprayed coatings are used widely to fight both high and low temperature corrosion. These coatings have proven their excellence in challenging environments such as boilers, by providing oxidation and heat resistance. Arc sprayed coatings also provide excellent resistance to atmospheric corrosion and are used on bridges and other infrastructure components.

Coatings that
deliver every time

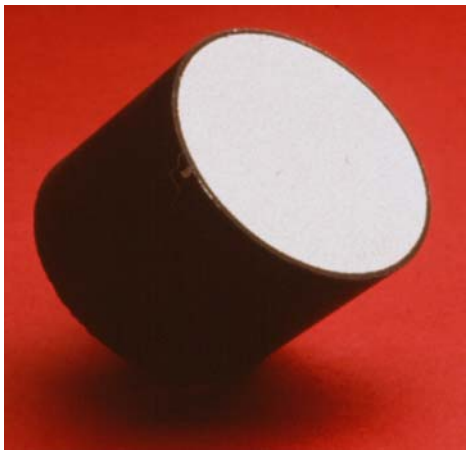
Consistency

Power Generation

The arc spray process is used in the power generation industry for coatings that provide corrosion protection, part restoration and life extension.

Electrical conductivity and resistivity

Arc sprayed aluminum, tin, zinc and other materials are used in applications requiring good electrical conductivity. Aluminum coating on metal oxide varistors, for example, creates an electrical conductivity contact surface on the face of the varistor.

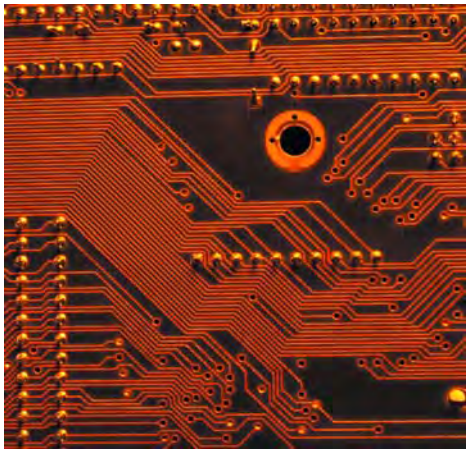


Heavy Equipment

The heavy equipment industry uses arc spray to restore worn components as well as new component surface defects. Application of the coatings can occur at OEM manufacture sites or at after-market repair facilities.

Part restoration

The forgiving nature and flexibility of the arc spray process enables economical application of thick coatings without significant loss of bond strength. For this reason, arc spray has become the process of choice for part restoration in applications where the replacement costs are high or the part has to be refurbished on-site.



Arc sprayed coatings are used for both electrical conductivity and resistivity. In the electronics industry, coatings such as tin are often used on nonmetallic parts because of their ability to accept solders.

Advanced options for elevated performance

Innovation

Praxair is committed to the development and advancement of arc spray equipment and applications. The innovation of technology such as the *ArcJet*™ attachment and ID extensions has continued to drive the process forward.

The *ArcJet* attachment is a revolutionary, patented technology that has allowed the arc spray processes to rival the coating quality of higher-end processes like plasma spray. The *ArcJet* attachment increases particle velocities and concentrates the spray pattern to produce dramatically improved coating quality. Coatings are similar to plasma-sprayed coatings; however, with the *ArcJet* attachment, these plasma-like coatings can be produced in much less time and at a fraction of the cost.

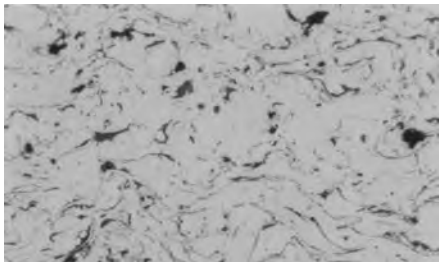
Other advantages that the *ArcJet* attachment has over conventional arc spray configurations include:

- Higher deposition efficiency
- Higher particle velocities
- Denser coating
- Focused, narrow spray pattern
- Superior bond strength
- Smoother as-sprayed coating
- More uniform microstructure

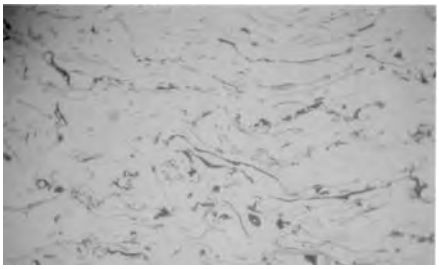
For years, the arc spray process has been limited in its ability to reach internal diameters. The development of ID arc spray extensions has been a major leap in improving process technology. Optional ID extensions, which are easily adapted to existing guns, are available in both straight-ahead and angle configurations and come in a variety of lengths. In addition, highly engineered nozzles, tips and positioners have been designed for applications that demand maximum durability.

Since the inception of arc spraying, power supplies used with the arc spray equipment have been standard off-the-shelf or slightly modified welding power supplies. Praxair has developed a power supply which minimizes the operating arc voltage. Lower operating voltage reduces the oxide levels within the coatings (improved particle size distribution) and increases deposit efficiency significantly depending on the material being sprayed. Importantly, the TCV 400 power supply provides improved performance at lower voltages than conventional power supplies by providing a more stable arc output. These benefits offer the user maximum process reliability and flexibility, including a wider spray parameter range.

Standard spray pattern



ArcJet spray pattern



Standard Arc Power Supply Fluctuation (± 10 V)

TCV 400 Arc Power Supply Fluctuation (± 400 mV)

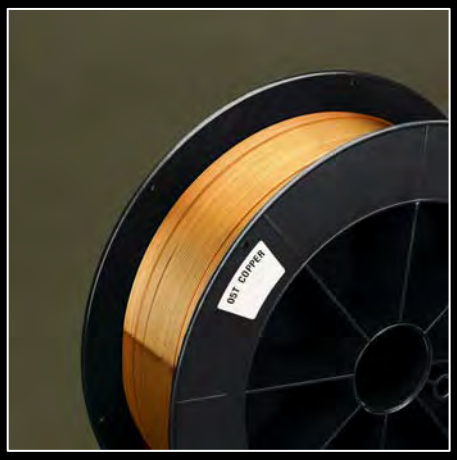
Exceptional wires for superior coatings

Superior

Whether your application calls for a reliable bond coat, dimensional restoration, or resistance to wear and corrosion, Praxair has a wire to meet the challenge. All Praxair wires are engineered and manufactured exclusively for the specialized needs of thermal spray. Strict specifications and production controls are utilized so that each wire is manufactured to a precise metallurgical composition and is free from defects such as slivers or contaminants. Care is also taken to ensure that our wires have the proper physical properties for thermal spraying – tensile strength, hardness and surface finish – and that they are properly spooled for reliable performance.

When you search for the right thermal spray wire, remember the company that built its reputation on arc spray technology: Praxair Surface Technologies. Let us work with you to continue to develop and perfect quality arc spray wires and coatings.

Quality thermal spray wires must be made to tight compositional tolerances, have the appropriate surface finish, and be spooled properly for consistent performance.



An extensive inventory of wires, available in 25- or 30-pound spools as well as bulk pay-off packs, assures prompt delivery and reinforces our commitment to the growth and development of arc spray applications.

Praxair Surface Technologies, Inc.
1555 Main Street
Indianapolis, IN 46224
USA

Telephone:
1-317-240-2650

Fax:
1-317-240-2596

Praxair Services GmbH 7 Co. KG
Am Muhlbach 13
D-87487 Wiggensbach
Germany

Telephone:
+49-(0) 8370-9207-0

Fax:
+49-(0) 8370-9207-20

www.praxairsurfacetechnologies.com
psti-info@praxair.com

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TAFA Incorporated
146 Pembroke Road
Concord, NH 03301
USA

Telephone:
1-603-224-9585

Fax:
1-603-225-4342

www.praxairsurfacetechnologies.com
psti-info@praxair.com

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