Arc Spray | Equipment Solutions.

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PRAXAIR
SURFACE TECHNOLOGIES

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Making our world more productive

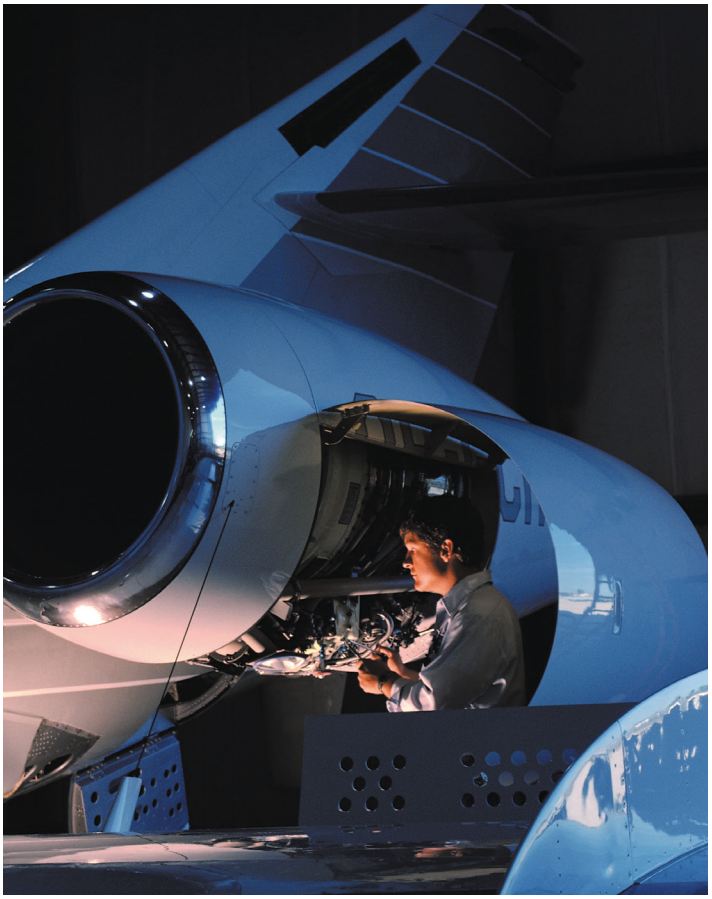
Arc Spray | Equipment Solutions.

Praxair Surface Technologies, Inc. is a world leader in thermal spray equipment, materials, and coatings technology. As a primary contributor to the development and application of arc spray with equipment and coatings routinely used by the aircraft engine industry for OEM and repair coatings for over 45 Years, Praxair has designed a complete family of products reflecting years of equipment engineering and coatings expertise. Our arc spray product line is certain to include a system that meets your specific quality, productivity, versatility and economic needs.

We recognize that the selection of a new arc spray system is just the initial step. That's why Praxair continues to develop and perfect new arc spray wires and coatings to help push thermal spray technology toward an exciting generation of wear, oxidation and corrosion-resistant applications. We dedicate talented engineers to team with you to develop materials, processes and coating solutions that expand the market for cost-effective thermal spray applications.

We'd like to work with you to select the best arc spray system and put it to work to 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: http://www.praxairsurfacetechnologies.com



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

Proven. A long history of proven success.

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" type systems and to innovative process enhancements like Internal Diameter (ID) spray extensions and the ArcJet™ enhanced spray attachment. With our innovative TAFAGlide wire delivery system as an option for our pull-type systems, the need for an expensive "push/pull" wire-feed technology is eliminated. We offer a variety of system configurations that will support the most demanding applications.

Manual/Economical
Model BP400

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

Model 8830MHU

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

Automatic Operation
Model 8835MHU

Adaptable to any spray environment, the 8835MHU features an electric motor driven "pull" 350-amp gun and modular unbundled control technology. The PLC based controls can be used in either automatic or manual mode. The gun is designed to be easily mounted on a manipulator such as an X-Y or robot.

Advanced Closed-Loop Control
Model 9910i CoArc™

For aerospace or high-end OEM application needs, the 9910i CoArc system features the 9935 or the new advanced smaller and lighter weight 9985 gun with improved spray hardware. Both guns are 350-amp rated with electric motor driven "pull" wire drives and utilize the TAFAGlide™ 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 and incorporate recipe storage and data acquisition.

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, a high volume air flow capability with an improved nozzle design to truly make the 9935 the state-of-the-art arc spray gun.

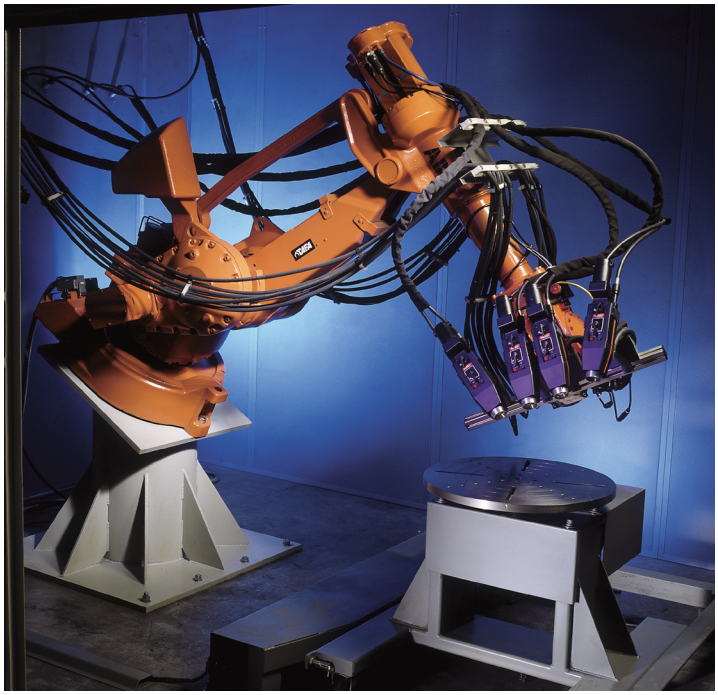
Versatility. Robust spray systems.

Praxair has modeled equipment strategies around, safety, reliability and versatility in use, and ease of operation. 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 excellent performance and reliable operation in thousands of applications through the years. The guns are designed to perform with minimal operator adjustment, assuring quality coatings time and time again. Process set-up requires only loading wire, setting the voltage and air pressure, and then 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 based controls are designed for hand-held or robotic operation and provide consistently repeatable coatings through a multitude of application possibilities and control options.

8830MHU and 8835MHU 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 module
- 400-amp 100% duty cycle power supply



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

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

Reliability. Dependable and consistent.

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. Utilizing a robustly engineered "push" wire delivery system, the BP400 virtually eliminates drive mechanism maintenance. This leads to lightweight yet rugged 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

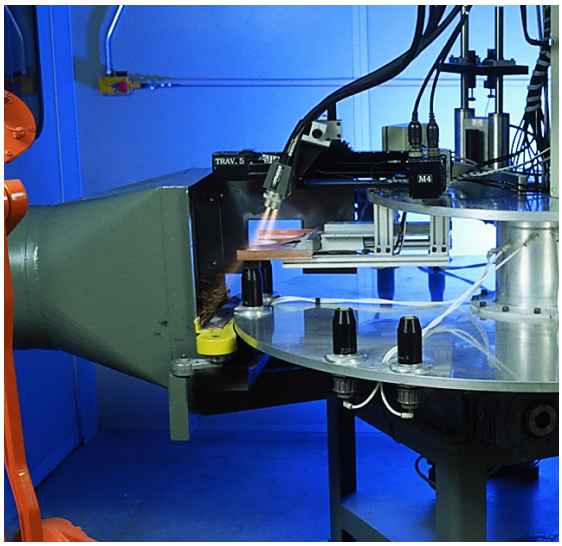
Simple to operate yet robust, the BP400 arc spray system produces high-quality metallic coatings.

Offering all the benefits of the other arc spray models plus much more, the 9935 gun when used with the CoArc™ system provides safety, automation integration capability, modularity, and robustness. Advanced controls make the CoArc system the ultimate in flexibility and ease-of-use. The CoArc system, with its "pull" wire drive and TAFAGlide wire delivery system technology combined with the optional closed-loop control of the gun's voltage and air pressure, truly revolutionizes the arc spray process to ensure consistent, reproducible coating quality.

CoArc system features

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

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 closed-loop control feature ensures consistent, reproducible coating quality.



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

Equipment Solutions. Arc Spray processes.

8830MHU

A proven, reliable and economical arc spray classic

Features

"Pull" wire feed design

Air motor driven

1.6 or 2.0 mm wire feed capability

Rated for operation up to 350 amps

Self-aligning spray head components

Designed for handheld operations

CE, UL and 3C certified

8830MHU system components

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

8835MHU

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

Features

"Pull" wire feed design

Electric motor driven

1.6 or 2.0 mm wire feed capability

Rated for operation up to 350 amps

PLC controlled

Built-in E-stop interface

Designed for automated operations

CE, UL and 3C certified

8835MHU system components

400-amp power supply

8835MHU control console

8835 gun

Modular, unbundled construction

ArcJet™ attachment included

Optional anti-skid retrofit kit

Optional ID extension for straight-ahead or angled spray

BP400

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

Features

"Push" wire feed design

1.6, 2.0, 2.3 or 3.2 mm wire feed capability

Rated for operation up to 400 amps

Simple, rugged gun design

Handheld or machine-mount operation

CE, UL and 3C certified

BP400 system components

400-amp power supply

PF400R control console

BP400 gun

Optional high-velocity conversion kit

Optional fan spray conversion kit

Optional 2.3 mm conversion kit

Optional ID or straight-ahead extensions

9910i CoArc™

Hi-tech arc spray system with advanced control features for exceptional coatings

Features

"Pull" wire feed design

1.6 or 2.0 mm wire feed capability

Rated for operation up to 350 amps

PLC controlled

"Touch-screen" operator interface

Spray head voltage and air pressure control

Recipe storage

CE, UL and 3C certified

9910i CoArc system components

400-amp power supply

9910i CoArc control console

9935 or 9985 guns

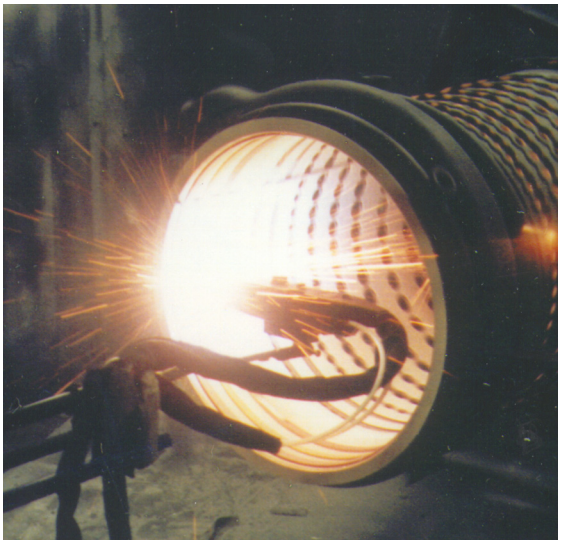
TAFAGlide Wire Delivery System

Options include: wire counter / "out" indicator, data acquisition capability, remote OIT

Diversity. Broad spectrum of wire applications.

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 the 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.

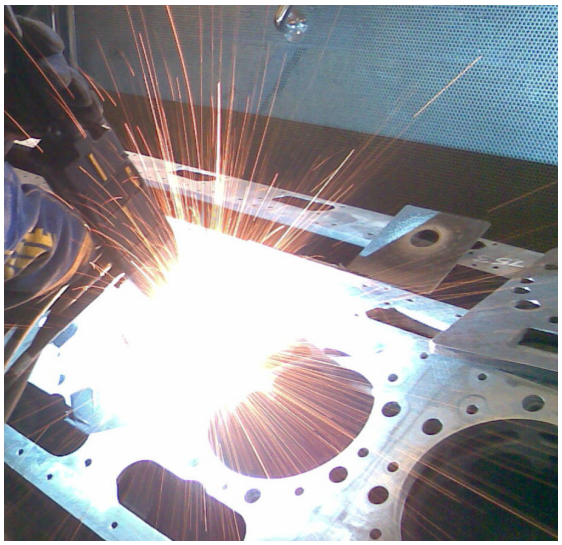


Aircraft component repair

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.



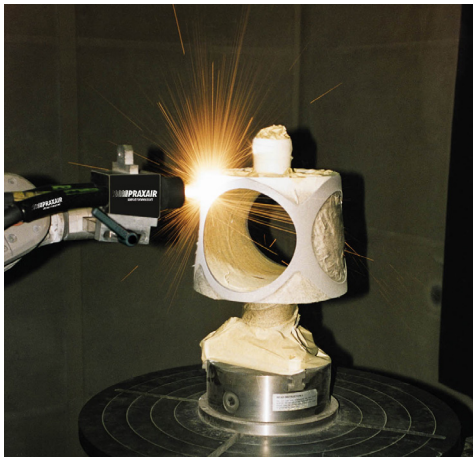
Heavy equipment repair

The heavy equipment industry uses arc spray to restore worn components as well as repair surface defects on new components. These coatings have proven their excellence in challenging environments such as the repair of large diesel engine decks. Application of the coatings can occur at OEM manufacturing sites or at after-market repair facilities.

Consistency. Coatings that deliver every time.

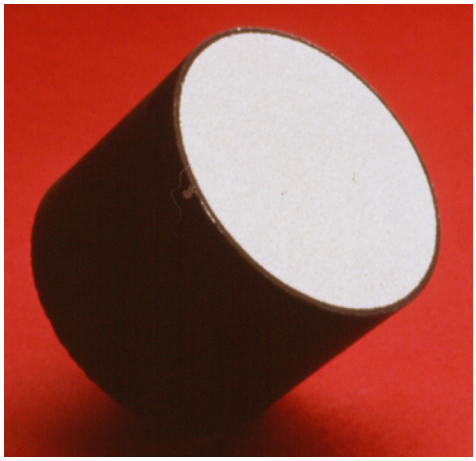
Power Generation

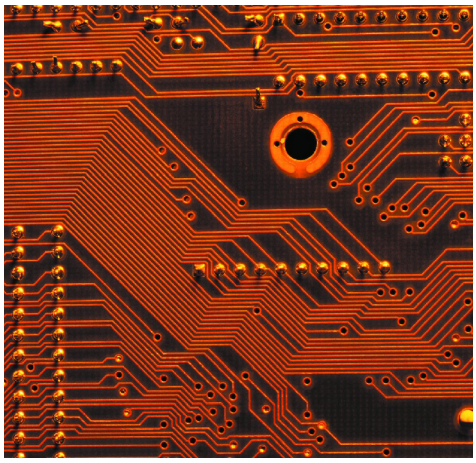
The arc spray process is used in the power generation industry for coatings that provide corrosion protection, part restoration and life extension.



Part restoration

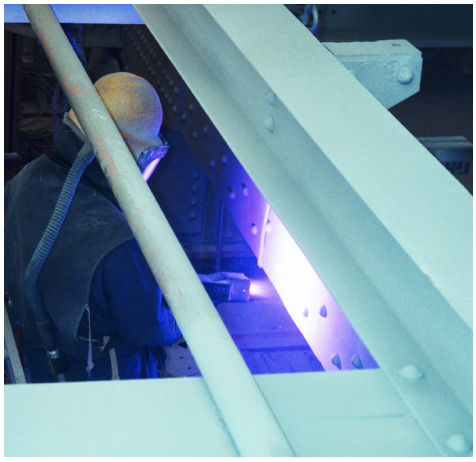
The forgiving nature and flexibility of the arc spray process enables economical application of thick coatings without significant loss of bond strength. For this reason, arc spray has become the process of choice for part restoration in applications where the replacement costs are high, or the part has to be refurbished on-site. With a wide variety of coating chemistries to choose from, coatings can improve wear and corrosion resistance compared to original base material characteristics.





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.



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.

Innovation. Advanced options for elevated performance.

Praxair is committed to the development and advancement of arc spray equipment and applications. The innovation of technology such as the ArcJet™ Spray Attachment, ID extensions and TAFAGlide™ Wire Delivery System 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 reliable ID arc spray extensions has been a major leap in improving process technology. These optional ID extensions, which are easily adapted to existing guns, are available in both straight-ahead and angled spray configurations and come in a variety of lengths. In addition, extensively engineered nozzles, tips and positioners have been designed for applications that demand maximum durability.

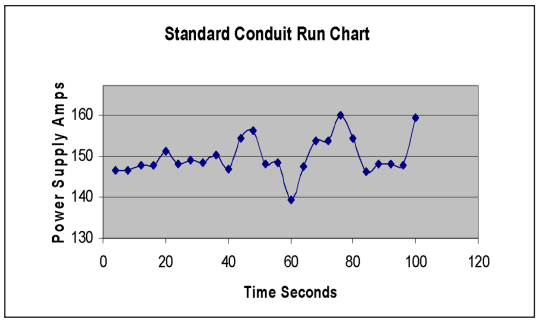
A key aspect of any robust arc spray process is consistent, trouble free wire feeding. Wire feed interruptions can have adverse effects on amperage and voltage stability, causing inconsistent coating quality and costly interruptions of spray jobs and even part re-work. Traditional arc spray systems employ steel or polymer lined wire transfer conduits which may cause excessive drag, friction and debris creation and should be kept as straight as possible to minimize wire feed interruptions. Utilizing an innovative and exclusive internal design, the TAFAGlide™ Wire Delivery System eliminates costly interruptions and increases coating quality and repeatability by reducing arc amperage and voltage fluctuations. TAFAGlides also eliminate the need for a costly and complicated wire "push drive" device typically used to reduce amperage and voltage fluctuations.

Spray Pattern Comparision

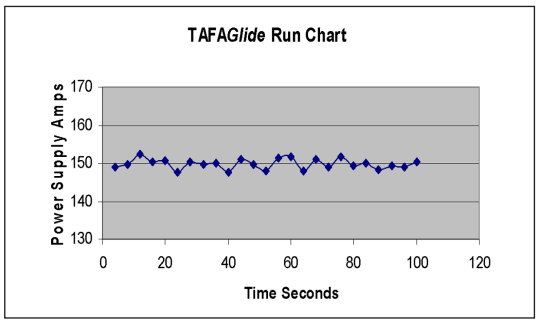
Standard Spray Pattern

ArcJet Spray Pattern

Conduit Amperage Fluctuation Comparison



Standard Conduit Fluctuation (± 10A)



TAFAGlide Fluctuation (± 2A)

Superior. Exceptional wires for superior coatings.

Whether your application calls for a reliable bond coat, dimensional restoration, or resistance to wear and / or 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. We offer wires in a range of diameters and, depending upon the volume of your production, offer different packaging sizes, ranging from spools up to large drums.

Arc Spray Solid Wires for a variety of applications

Material options include pure metals and alloys that offer reliable quality and lot-to-lot consistency.

- Part restoration / reclamation
- Corrosion protection
- Bond coats

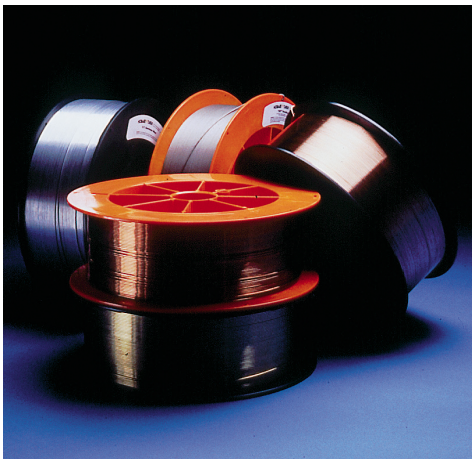
Arc Spray Cored Wires engineered for application solutions

Cored wire allows for the use of compositions that can't be drawn into solid wire form. Cored wire technology elevates the use of arc spraying into the engineered materials arena and for use in demanding applications.

- Wear resistance
- Corrosion applications
- Wear and corrosion
- Composites: carbides in metallic matrix
- High temperature materials such as MCrAlYs

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.

Our Concord, NH facility has an extensive inventory of wires, available in 25- or 30-pound spools as well as bulk pay-off packs, assuring prompt delivery and reinforcing our commitment to the growth and development of arc spray applications.



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

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PRAXAIR SURFACE TECHNOLOGIES

Making our world more productive

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Praxair is committed to continuous product improvement. Specifications, appearances, features and dimensions are subject to change without notice.

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Interested? Contact us today!

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