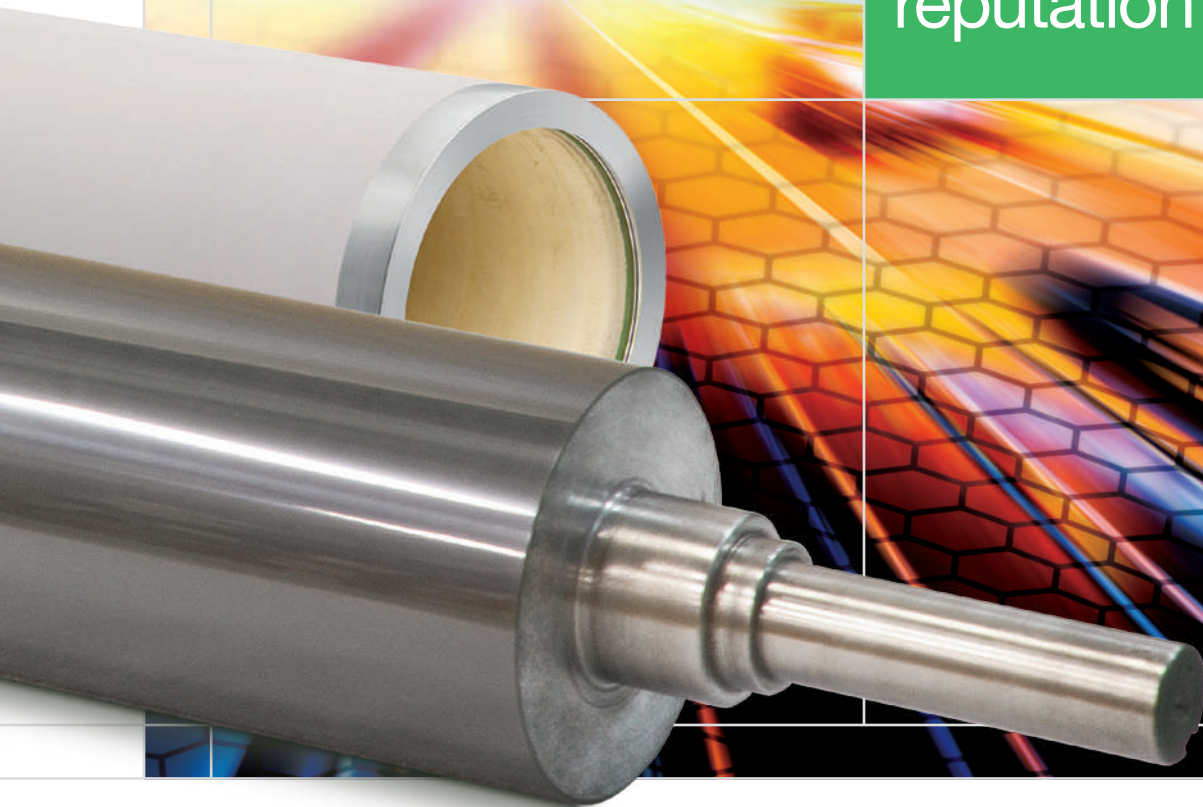




Laser-engraved anilox rolls and sleeves

What's your
reputation worth?



Making our planet more productive™

In 1979, Praxair Surface Technologies created the anilox roll industry by producing the world's first laser-engraved ceramic roll. For more than a quarter century, printers and converters around the world have turned to Praxair for anilox rolls and coatings that fit their application and offer longer service life, reduced downtime and greater productivity. See why...

Applications

- Applicators (Coating, Laminating)
- Corrugated (Pre- and Post-Print)
- Envelope
- Flexible Packaging
- Folding Carton
- Liquid Carton/Aseptic Packaging
- Metal Decorating
- Newspaper
- Printed Electronics
- Publications
- Single Use (Tissue, Towel, Cups)
- Tag and Label
- Wallcoverings

Anilox roll innovation since 1979. Praxair sets the industry standard.

1979



Co-ventured first laser-engraved ceramic roll

1981



First laser-engraved ceramic roll produced in Europe

1982



First laser-engraved roll installed in the U.S.

1986



Charlotte, NC USA printing industry service center opens

1988



60-degree engravings developed
First successful test in offset applications developed

1990



Kozuki, Japan printing industry service center opens

1994



Novara, Italy printing industry service center opens

Double-hit and multi-hit engraving techniques developed

1996



YAG laser-engraving technology developed

Breakthrough first-generation anilox sleeve developed

When your reputation is on the line, we protect it.

Praxair's Laser-Engraved Anilox Rolls and Sleeves Lead the Industry

Praxair Surface Technologies' high standards in manufacturing and engraving anilox rolls and sleeves can help protect your reputation.

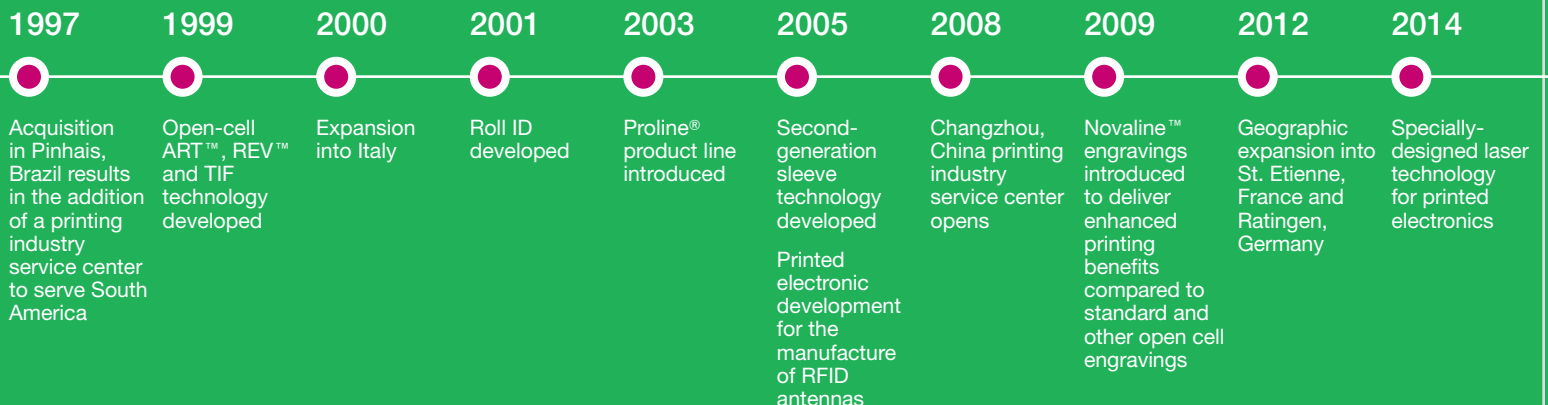
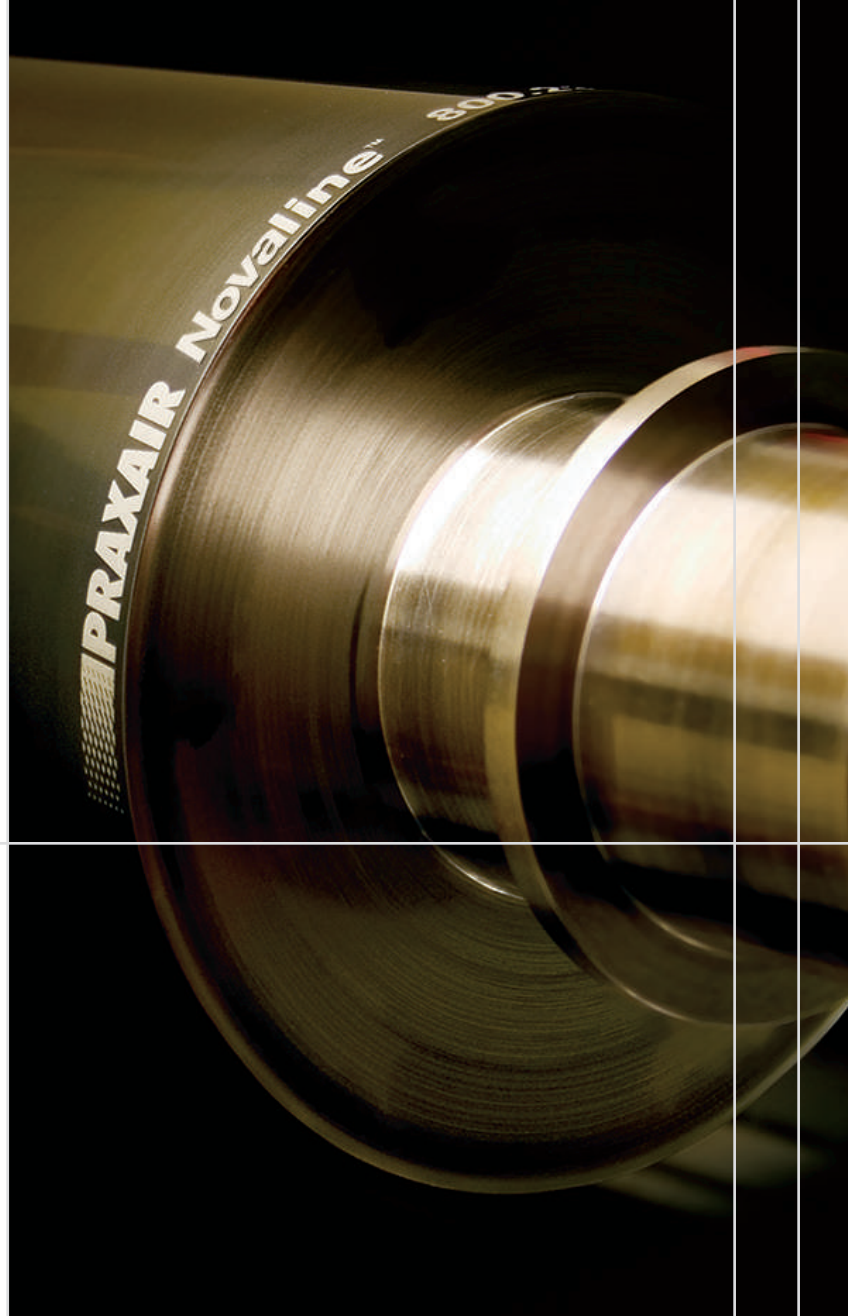
And only Praxair performs every step in the production process, including:

- Making our own coating powders and gases
- Developing our own coating technology and equipment
- Engraving and finishing in-house

No other anilox roll supplier has more control for ensuring top quality in every product. Because your reputation is on the line every time you're on the press.

Support when and where you need it

We're more than an innovative manufacturer of anilox rolls, sleeves and coatings. Every day, Praxair puts a team of more than 150 people—in addition to a robust agent and distributor network—in seven facilities on four continents to work for you. We provide roll audit and full product technical support, helping you get the best performance, repeatability and quality from your people and equipment. With our worldwide network of Printing Industry Service Centers, we're always close by. **With your reputation on the line, why settle for anything less?**



Protecting your reputation step-by-step.

A closer look at our manufacturing process:

Nobody does it like Praxair. We combine our know-how from high-tech industries such as aerospace, oil exploration and energy to provide you with the coating and engraving techniques we have developed over the years. The result is uncompromised high-precision engravings for superior ink release.



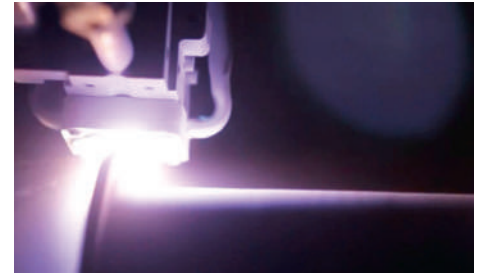
1. Inspection/Base Repair

To start, each roll or sleeve is inspected. Praxair service technicians check each anilox roll or sleeve for pattern, screen count, volume, cleanliness, damage and any other relevant conditions. The technicians inspect rolls for cell depth and wear and take digital photographs of each roll's engraved surface using a high-powered microscope. Damage such as dents is repaired prior to restoring the roll.



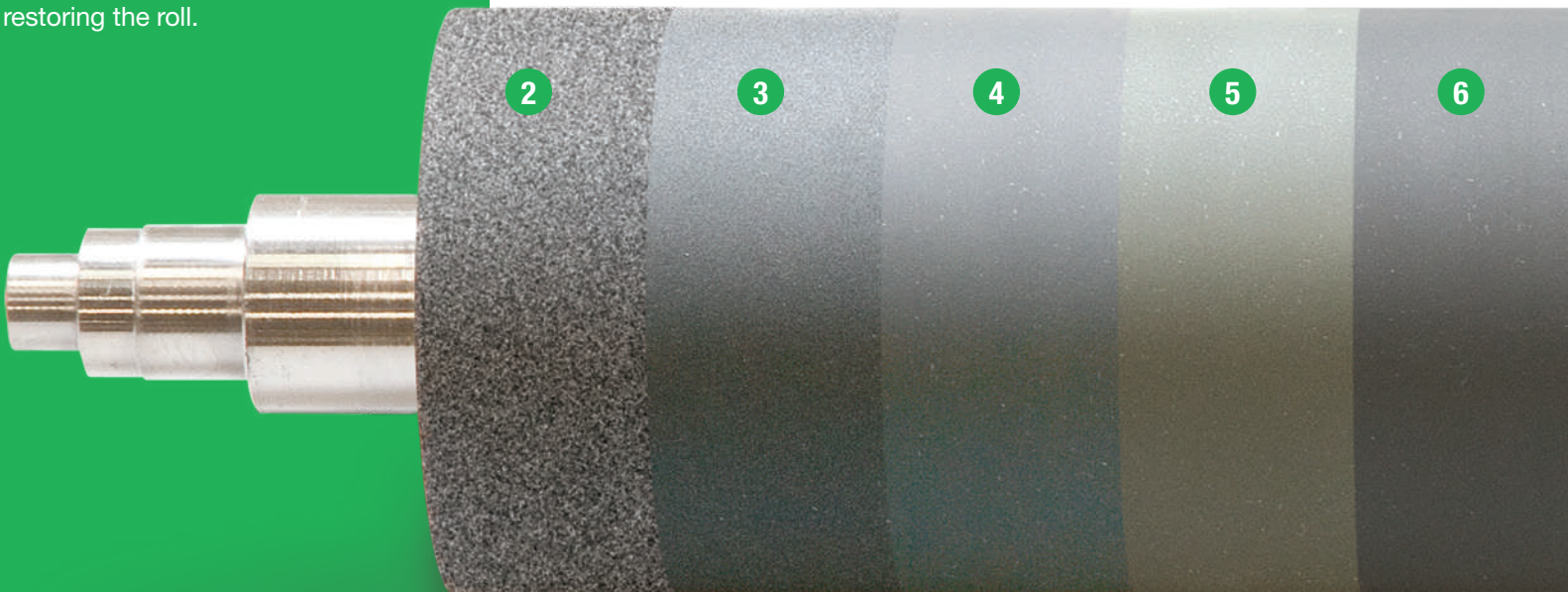
2. Grit Blast

Prepared rolls are "grit blasted" to precisely roughen the roll surface with abrasive particles in preparation for coating. Oxides and other solid contaminants can be removed by impinging all or selected areas of the roll with an abrasive material.



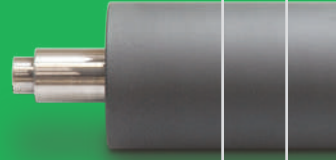
3. Coating/Sealing

Utilizing a proprietary thermal spray powder and plasma torch to create a dense, hard, low-porosity chrome-oxide ceramic coating and a proven sealing technology makes our rolls more corrosion resistant than many others. This high-integrity, uniform coating extends the life of rolls and sleeves.



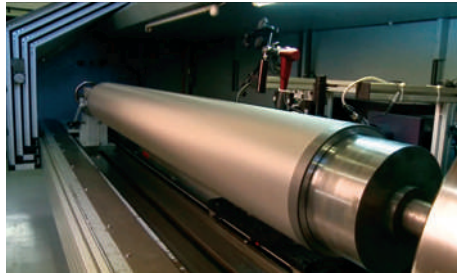
Mechanical and dimensional integrity is crucial for base rolls

Each of Praxair's anilox rolls is built to exacting specifications, which is crucial to print quality.



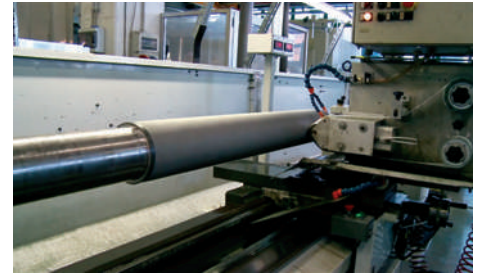
4. Grinding/Lapping

The newly coated surface is ground to precise dimensions, removing all excess materials, and polished to create a smooth surface.



5. Engraving

The laser engraves a microscopic pattern into the roll or sleeve specific to the type of print application. We can engrave from eight lines per inch up to high-resolution patterns of 1300 lines per inch and over a million cells per inch. This proper cell volume and structure allows customers to achieve accurate color reproduction.



6. Superfinishing

This process removes the rough peaks from the cell walls, resulting in a smooth, even surface. Superfinishing reduces blade vibration, premature blade wear and ink pooling, and ensures consistent ink delivery over time.



7 Praxair ensures superior quality worldwide

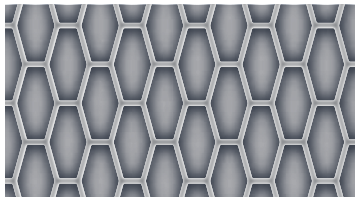
- **Met Labs.** Only Praxair Surface Technologies places a metallurgical laboratory (Met Lab) at each of our Printing Industry Service Centers. Equipped with testing instrumentation and software, our labs allow our technicians to evaluate and certify every anilox roll or sleeve for coating thickness, hardness, line and screen count, coating adhesion, erosion and volume count—to the same high standard of quality everywhere in the world.
- **Tech support.** Our Design Optimization Unit™ is more than technical support. We work with other suppliers (e.g., ink and plate suppliers) to ensure the entire operation is optimized and problems are resolved quickly.
- **ISO certifications.** We have invested in our manufacturing facilities to ensure the highest levels of quality in a safe environment. Our facilities are ISO 9001:2008 certified.

High-performance solutions for versatile applications.

Novaline™ and Proline® Series Laser Engravings

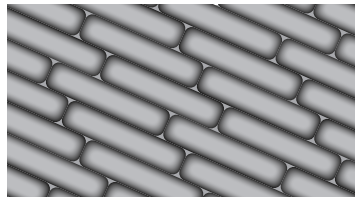
Novaline™ Series

High-quality laser engraving options designed to let rolls run cleaner longer



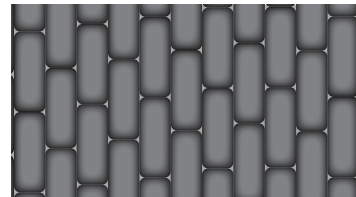
Novaline™ UV Gold

Ideal for UV ink application, including aluminum, film and paper packaging



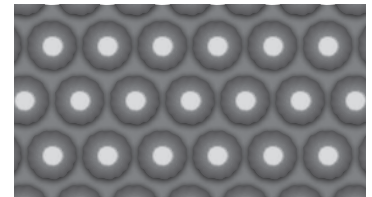
Novaline™ Gold

Developed for high-density flexo printing, particularly high-definition flexible, paper and corrugated packaging



Novaline™ Silver

The right choice for solid, process and text high-density printing

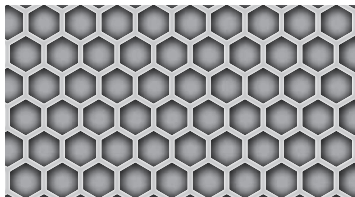


Novaline™ ART™ Gold

Designed for demanding coating, specialty materials and varnish applications

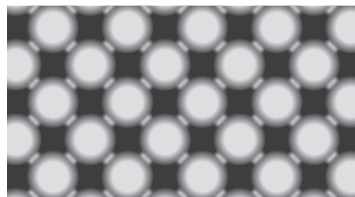
Proline® Series

Exceptional coverage and coating combined with fast cleanup for better productivity



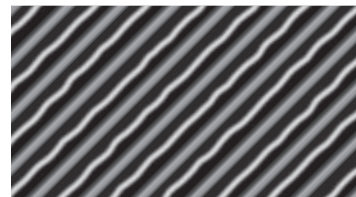
Proline® 60°

Suppresses moiré effects and delivers easy ink transfer and uniform cell structure—our most popular pattern



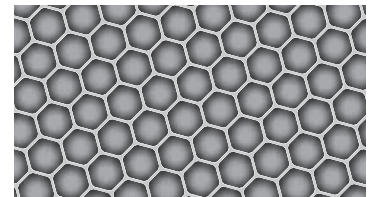
Proline® ART™

Anilox Reverse Technology—designed for flexo printing, offset coating, gravure and laminating applications



Proline® HEL*

Open cell structure offers better ink release for gravure and coater applications

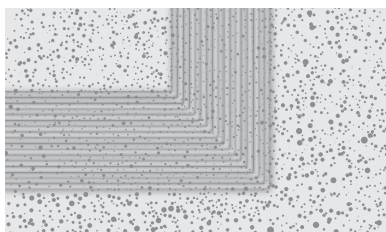


Proline® ISF*

Minimizes splash of UV inks

Printed Electronics

*Not available in the U.S.



Engraving used to create electrical devices on substrates such as flexible displays, smart labels, posters and active clothing

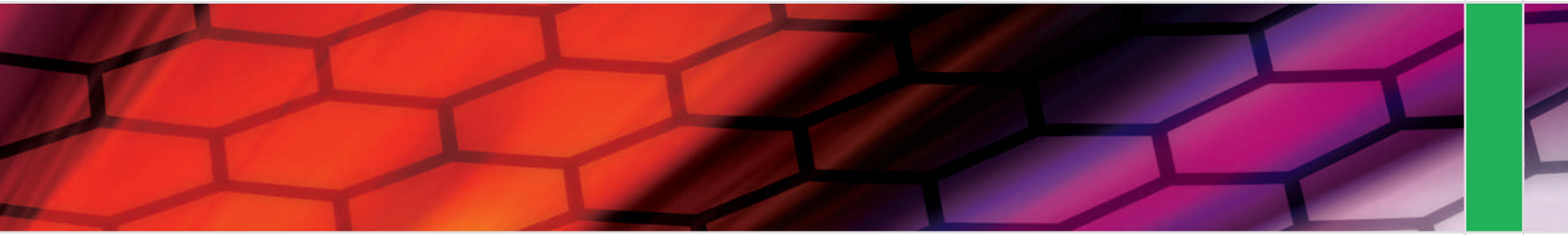
Engraving images are engineered drawings and are a visual representation only.

Why stop with anilox rolls and sleeves? The same quality and leadership we apply to your rolls can apply to other parts of your operations that can benefit from a highly durable or release coating:

- Agitators
- Chamber pumps
- Corona treater rolls
- Feed screws
- Idler rolls
- Ink pans
- Slitter blades
- Pressroom components








Trusted quality and durability for your critical press components

www.praxairsurfacetechologies.com



Industry connections

Innovations come from interactions with the industry and understanding the latest demands and challenges facing our customers. That's why we participate in key associations and initiatives around the world, including:

| | | |
|---|---|---|
|  <p>FTA (Flexographic Technical Association) Flexo Quality Consortium— founding member</p> |  <p>Der FlexoDruck. DFTA (German Flexographic Technical Association)</p> |  <p>ATF (French Flexographic Technical Association)</p> |
|  <p>FTAJ (Flexographic Technical Association of Japan)</p> |  <p>ABFlexo/FTA Brazil</p> |  <p>Premier Vendor ABFlexo Top 10 21ª Edição do Prêmio Qualidade Flexo Prof. Sérgio Vay 3-TIME WINNER</p> |
|  <p>ATIF (Italian Technical Association for the Development of Flexography)</p> | <p>Industry academic programs:</p> <ul style="list-style-type: none"> - Clemson University (U.S.) - Fox Valley Technical College (U.S.) - Swansea University (Wales) - University of Stuttgart (Germany) - Western Michigan University (U.S.) | |

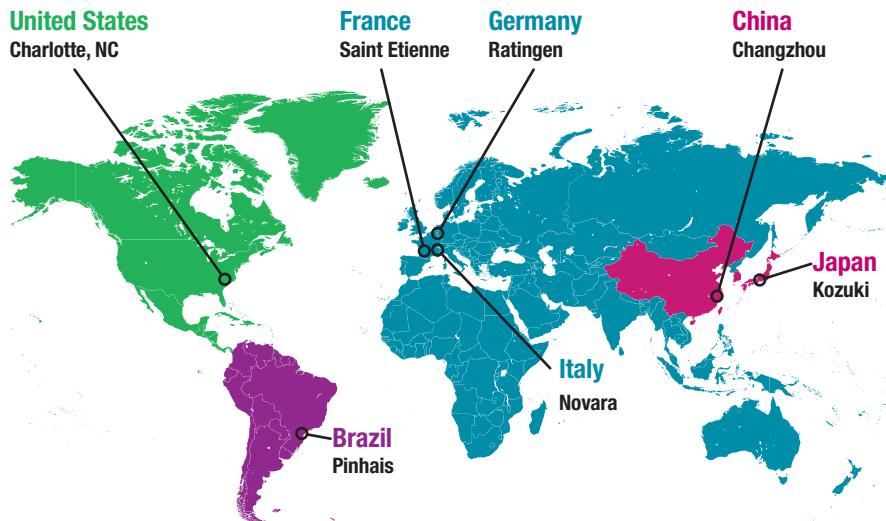
Praxair Printing Industry Service Centers



Wherever you are in the world, you'll find a Praxair Printing Industry Service Center there to protect your reputation. Our world-class Operational Excellence System—which includes a robust worldwide agent and distributor network—enables us to deliver quick responses and options, and uniform, repeatable results you can rely on. Whether we build or rework your roll in the Americas, Europe or Asia, you can be confident in the processes, coatings and quality engravings.

Call the nearest location or email psti-info@praxair.com.

Or visit www.praxair.com/printing to learn more.



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Making our planet more productive™



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