



LINCOLN
ELECTRIC

PIPELINE

WELDING & CUTTING SOLUTIONS



The Lincoln Electric Company

Founded in 1895 by John C. Lincoln, The Lincoln Electric Company is the world leader in the design, development and manufacture of arc welding products, robotic arc welding systems, plasma and oxyfuel cutting equipment and has a leading global position in the brazing and soldering alloys market. Headquartered in Cleveland, Ohio, Lincoln Electric has a global network of manufacturing, distribution, sales and technical support covering more than 160 countries.

INNOVATION

With a long history of innovation in arc welding equipment and consumables, Lincoln Electric has been providing cutting-edge products and comprehensive welding process solutions to our customers for nearly 120 years. We operate the industry's most comprehensive research and product development program, supported by our R&D centers around the world.

CUSTOMER COMMITMENT & SUPPORT

High-quality products and great customer service are important aspects of the Lincoln Electric story, but it's our unmatched welding expertise that truly sets us apart. If there's a better way for you to weld, we'll help you find it. If automation can improve your bottom line, we'll guide you through the decision-making process. If there's a method that can help you reduce costs, we'll show you how – and why.



We are driven by customer satisfaction and known as the supplier of choice in the many industries we serve. We continuously strive to exceed customer expectations and are not simply known as a provider of equipment and consumables, but as a provider of complete welding solutions.



THE PIPELINE INDUSTRY

Welding Solutions to Meet the Most Demanding Requirements – Yours

INDUSTRY CHALLENGES

Oil, natural gas and water – the world’s most valuable commodities – flow through pipes. Indeed, pipelines stitch the world together, carrying the raw materials needed to power and sustain civilization. And the world is changing. Resources are coming from more remote locations, populations are outgrowing their infrastructure and the demand for new pipeline construction is growing. Lincoln Electric understands this. Whether it’s a subsea line in arctic Russia or a water line in central Africa, we have the products, solutions, experience and expertise to help you build a quality pipeline efficiently, cost effectively and safely.

TYPICAL INDUSTRY APPLICATIONS

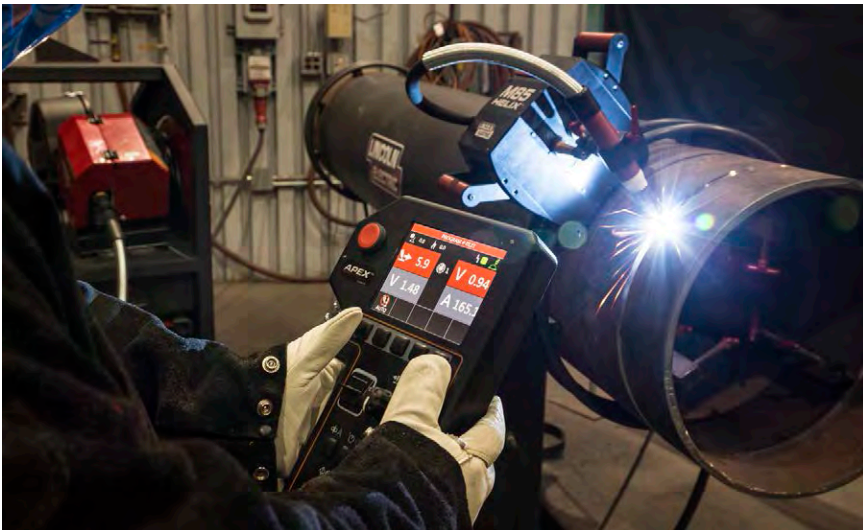
Growing demand, higher service pressures, sour media, more severe operating environments, tighter governance and stricter environmental regulations all affect the industry. Contractors must balance these challenges with the necessity of managing costs and meeting deadlines.

New, high-strength steels allow for thinner pipe walls, but place more emphasis on the weld integrity, which must be high-quality, repeatable and not susceptible to brittle fracture and hydrogen-induced cracking. While SMAW has long been the standard, newer materials demand improved welding processes, including low-hydrogen manual, semi- and fully-automated welding solutions.

LINCOLN ELECTRIC PROVIDES SOLUTIONS

Our industry specialists are knowledgeable in every welding process involved in building a pipeline. And we offer a full matrix of equipment and consumable solutions engineered to meet or exceed the welding requirements for each of the base materials common to the pipeline industry.

Lincoln Electric remains committed to advancing the science and technology of welding for customers in the pipeline industry. As a strategy, we invest heavily in engineering, automation, research and development to further enhance our leading position in the market. Highly trained and experienced technologists, engineers and doctorate-level experts are available to customers to troubleshoot problems in the field and develop new processes or consumable solutions on actual customer parts. This industry-leading technical support team has one focus – providing you with the best pipeline welding solutions available.





ONSHORE & CROSS-COUNTRY

SMAW has long been the standard for safe, economic pipelines, but that is changing. Lincoln Electric's portfolio of solutions addresses the challenges surrounding high-strength pipeline materials coupled with increasingly demanding design criteria. Contractors today face deadline constraints and pressures of perpetual cost reduction, which leads to higher productivity needs from the consumable and equipment. Lincoln Electric remains ahead of the current industry trends, providing solutions supporting semi- and fully-mechanized processes as part of the overall process solution.

Harsh in-service environments and the use of increasingly sour media have led to the development of advanced alloys and application technologies. Lincoln Electric remains at the forefront in research and development of consumables for low-alloy material as well as high-strength, stainless, duplex and super duplex, nickel-based corrosion resistant alloys (CRA) designed to exceed the most stringent criteria.

Finally, we need to consider the influence of the geological aspect of pipeline construction. No longer is it enough for mechanicals to simply withstand the environmental temperatures, corrosion and pressure associated with the product being transported. Lincoln Electric leads the field in research and the effects of strain as a result of seismic movement, mud slides and freezing and thawing of the ground.

Best-Fit Solutions

Consumables

- » SMAW: Pipeliner® LH-D80, 90, 100, 110, 120
- » SMAW: Pipeliner® Arc 80, 7P+, 8P+
- » FCAW-G: Pipeliner® 81M, 101M, 111M, 91Ni1-HSR
- » FCAW-S: Pipeliner® NR208P, XP
- » GMAW: Pipeliner® ER70S, 80S, 80Ni1, ER110 ER120

Equipment

- » Vantage and SAE series: Engine Drives
- » Flextec™ and Speedtec® Series: SMAW, FCAW manual and semiautomatic
- » Power Wave® Series: GMAW, FCAW semi- and fully-automated

OFFSHORE & SUBSEA

Approximately 10 percent of pipeline construction (by length) is offshore. Submerged pipelines pose enormous challenges for product and crews, including high atmospheric pressures, temperature extremes, inaccessibility and difficult terrain. Lincoln Electric understands the enhanced criteria required for such a hostile application. Through collaborative integration with our clients, Lincoln Electric develops process and product solutions driving quality, safety and efficiency.

S-LAY INSTALLATION

When performing S-lay pipeline installations, pipe is eased off the stern of the vessel as the boat moves forward. The pipe curves downward from the stern through the water until it reaches the “touchdown point,” or its final destination on the seafloor. As more pipes are welded in the line and eased off the boat, the pipe forms the shape of an “S” in the water. S-lays can be performed in waters up to 1,981-meter (6,500 feet) depths, and as many as 6 kilometers (4 miles) a day of pipe can be installed in this manner.

J-LAY INSTALLATION

Overcoming some of the obstacles of S-lay installations, J-lay pipeline installations place less stress on the pipeline by inserting the pipeline in an almost vertical position. Pipe is lifted via a tall tower on the boat, and inserted into the sea. Unlike the double curvature obtained in S-lay, the pipe only curves once in J-lay installations, taking on the shape of a “J” under the water. The reduced stress on the pipe allows J-lays to work in deeper water depths. Additionally, the J-lay pipeline can withstand more motion and underwater currents than pipe being installed in the S-lay fashion.

REEL-LAY INSTALLATION

Reel-lay (or spool-based) barges contain a vertical or horizontal reel that the pipe is wrapped around, and are able to install both smaller-diameter pipe and flexible pipe. When using reel barges, the welding together of pipe sections is done onshore, reducing installation costs. Reeled pipe is lifted from the dock to the vessel, and the pipe is simply rolled out as installation is performed.

Whether the pipeline installation calls for S-lay, J-lay or Reel-lay, stringent criteria mandates welds that are strong, flexible and resistant to deterioration. Lincoln Electric’s integrated process solutions provide an unparalleled portfolio of welding products for subsea applications.





SPECIALIZED CONSUMABLES

Lincoln Electric created the Pipeliner® family of products specifically for the pipeline industry. This complete line of specially engineered consumables offers consistent performance and robust mechanical properties. Materials are lot-controlled and -tested with certified results provided to the customer. Electrodes are available for low-hydrogen (vertical up and vertical down), as well as cellulosic needs, and everything is shipped in hermetically sealed, moisture-resistant containers. Most importantly, Pipeliner products come with global support and training from Lincoln Electric's unmatched network of suppliers, technicians, scientists and instructors.

QUALITY

Steel is a critical ingredient in welding electrodes. The chemical composition of that steel is crucial to the way the electrode performs.

Most manufacturers of welding consumables rely on a heat certification (cert) from the steel mill as verification of the chemical composition of their steel. At Lincoln Electric, we don't rely on the mill's heat cert. Every coil of incoming rod is tested twice for chemical composition before it's put into production. Then, the properties in specific coils of steel are matched with qualities that are desirable in specific electrodes and the steel is put into production accordingly – an important extra step that helps ensure performance and consistency.





ADVANCED TECHNOLOGIES

Today's advanced power sources are quickly making their way into pipeline spreads across the globe. While Lincoln Electric's Surface Tension Transfer® (STT) technology remains the gold standard for open root girth welds, the Power Wave® technology used to drive the STT modules also delivers technology far beyond the root pass. It increases productivity and monitors weld quality while simultaneously relaying data in real-time to the cloud. Processes such as Rapid Arc® and Rapid X® realize significant productivity gains as a result of advanced power sources delivering less spatter and faster travel speeds than traditional pulse modes.

And the latest cloud-based production monitoring tools, such as Checkpoint®, can enable any networked welding power source to transmit its own weld performance data in real time. These systems can track metrics and provide analysis down to the level of a single weld to establish productivity benchmarks, provide support, enhance troubleshooting capability and more.





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CUSTOMER ASSISTANCE POLICY

The business of The Lincoln Electric Company® is manufacturing and selling high quality welding equipment, consumables, and cutting equipment. Our challenge is to meet the needs of our customers and to exceed their expectations. On occasion, purchasers may ask Lincoln Electric for information or advice about their use of our products. Our employees respond to inquiries to the best of their ability based on information provided to them by the customers and the knowledge they may have concerning the application. Our employees, however, are not in a position to verify the information provided or to evaluate the engineering requirements for the particular weldment. Accordingly, Lincoln Electric does not warrant or guarantee or assume any liability with respect to such information or advice. Moreover, the provision of such information or advice does not create, expand, or alter any warranty on our products. Any express or implied warranty that might arise from the information or advice, including any implied warranty of merchantability or any warranty of fitness for any customers' particular purpose is specifically disclaimed.

Lincoln Electric is a responsive manufacturer, but the selection and use of specific products sold by Lincoln Electric is solely within the control of, and remains the sole responsibility of the customer. Many variables beyond the control of Lincoln Electric affect the results obtained in applying these types of fabrication methods and service requirements.

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