

INCREASE YOUR
PRODUCTIVITY
FROM ROOT TO CAP
UP TO

10 TIMES

PROCESS PIPING 4.0

THE NEXT STEP IN MECHANIZATION



www.lincolnelectriceurope.com

LINCOLN
ELECTRIC



TABLE OF CONTENTS

Industry Challenges	6
Piping Solution – The Next Level	8
Data	10
Everything From One Hand – One Stop Solution	11
Pipefab, One Machine From Root To Cap	12
Mastering Data – Software Solution	13
The Next Dimension In Premium Wires	15
Experts Summary	17

BEING PRESENT LOCALLY
MAKES US MORE AWARE GLOBALLY

Benefit from the Market Leader

125
YEARS OF EXPERIENCE



NUMBER ONE
IN WELDING

325+
GLOBAL R&D TEAM

11 000
EMPLOYEES WORLDWIDE

38
SOLUTION
CENTERS

3.0
BILLION USD REVENUE



LOCATIONS

- Global Headquarters
- Solution Centers

EVOLUTION

Lincoln Electric is the world leader in the design development & manufacture of arc welding products and equipment, robotic welding systems and PLASMA/Oxy-Fuel cutting equipment, along with the newly introduced mechanized welding systems for the welding of Process & Power piping. Customer focus is one of Lincoln Electric's key goals in providing new and existing customers with "Value Added Propositions" to increase their productivity and business growth.

With 325+ Research and Development Engineers worldwide and 36 Welding Technology Centers, Lincoln Electric aims to be at the forefront of welding technology.

With innovative and breakthrough welding and cutting solutions we are committed to the development of the future and integrate the latest technologies to reach engineering boundaries.



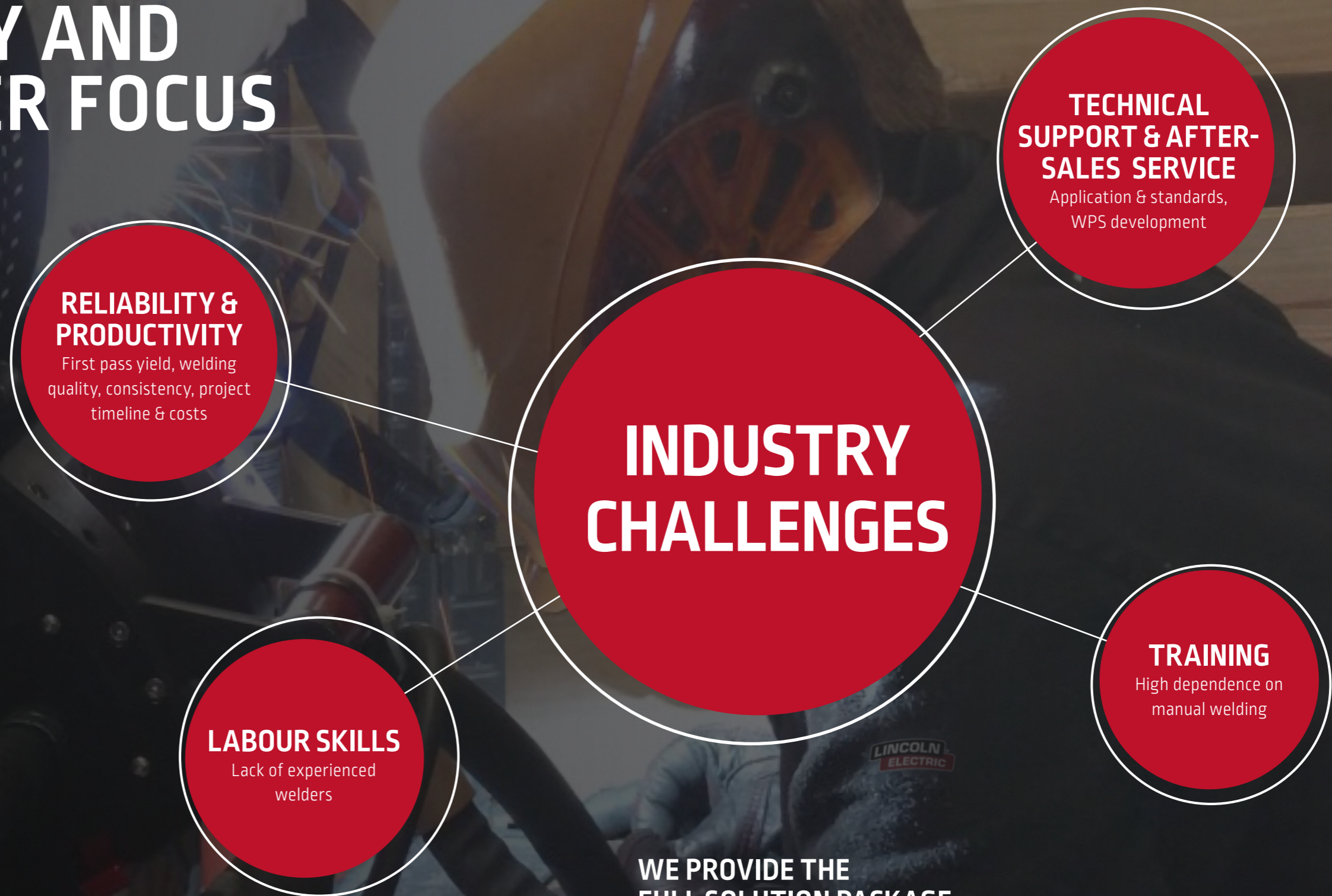
1939 Power source



Lincoln Pipefab™



INDUSTRY AND CUSTOMER FOCUS



WHAT IS PROCESS PIPING?

Process Piping commonly refers to a network of piping systems that transports industrial gases, fuels, water or steam, around industrial facilities, installations or pipelines associated with the manufacture of products.

These piping systems comprise a wide range of dimensions and material grades, that require experienced welding personnel and operators to deliver a high level of quality and process adherence, whilst maintaining productivity to meet project deadlines.

WE PROVIDE THE FULL SOLUTION PACKAGE

Lincoln Electric companies offer a full solution to master challenges and control the major demands of this market application:

- **Increase welding productivity and operating factor**
- **Keep your project costs under control**
- **Support a consistent and easy-to-apply WPS**
- **Minimize time to train and qualify welders**
- **Secure an agile after-sales service**

PIPING SOLUTION THE NEXT LEVEL

ONE STOP SHOP

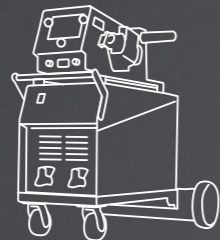
Lincoln Electric is the only company providing customers the full process piping solution, improving productivity up to 10x

FINISH

*TOTAL CYCLE TIME PER JOINT IMPROVEMENTS

NON ROTATING
5G

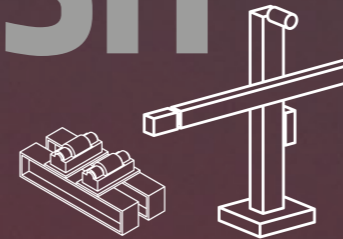
ROTATING
1G



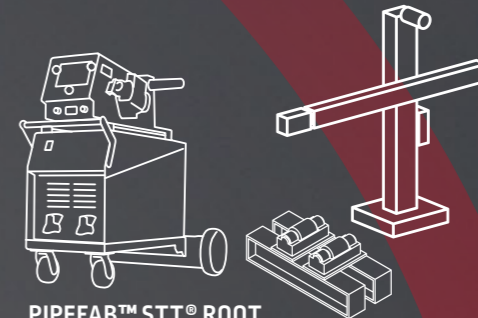
PIPEFAB™ SMART PULSE FILL & CAP



PIPEFAB™ STT ROOT APEX/HELIX M85 MECHANISED FCAW FILL AND CAP



PIPEFAB™ STT ROOT + POWER WAVE® AC/DC 1000® FILL & CAP + PIPEWELD SAW COLUMN AND BOOM



PIPEFAB™ STT® ROOT + SMART PULSE™ FILL & CAP + PIPEWELD GMAW COLUMN AND BOOM

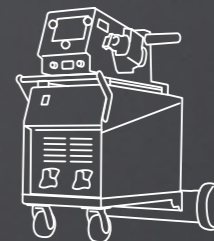
UP TO 60% DEPOSITION RATE VS SMAW

UP TO 4 TIMES FASTER

UP TO 10 TIMES FASTER

UP TO 20% OPERATING FACTOR VS SEMI-AUTOMATIC GMAW-P

UP TO 15% DEPOSITION RATE VS STANDARD CV



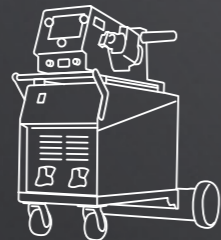
PIPEFAB™ + SMART PULSE™ FILL & CAP



WELDING MECHANISATION APEX/HELIX M85 PACKAGE

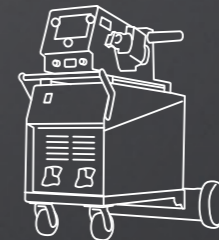
UP TO 20% OPERATING FACTOR VS SEMI-AUTOMATIC

UP TO 70% CYCLE TIME VS MANUAL GTAW



PIPEFAB™ STT® ROOT PASS

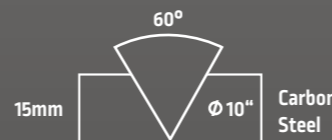
UP TO 70% CYCLE TIME VS MANUAL GTAW



PIPEFAB™ STT® ROOT PASS



ROOT & HOT PASS (1): GTAW FILL & CAP (2): SMAW MANUAL WELDING



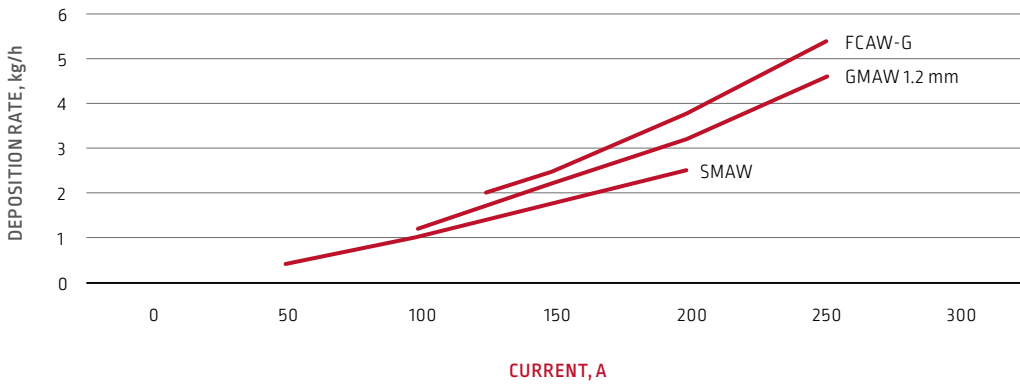
Base material: ASTM A106 gr B
Pipe: 10" Sch.80
O.D: 273 mm
Wall thickness: 15 mm
V-Joint: 60°

*these are typical cycle times tested in lab conditions

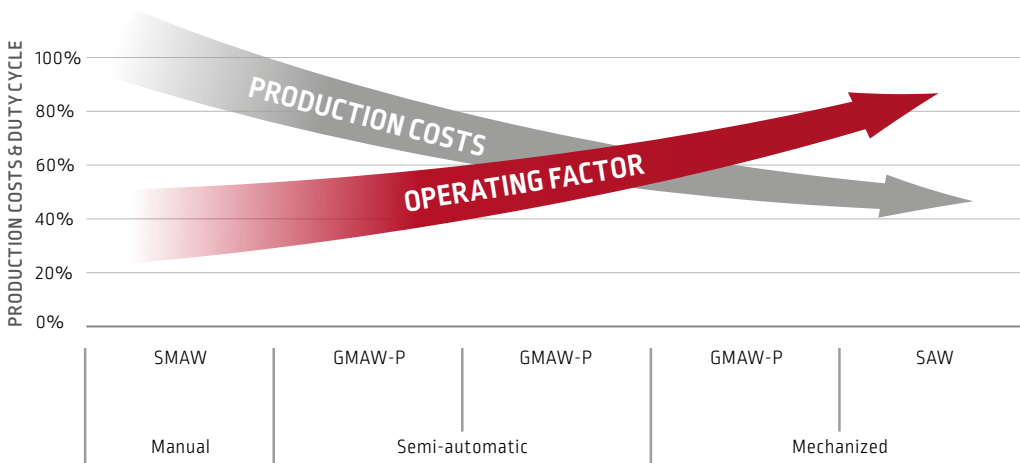
Where are you today and where would you like to be tomorrow? Check your present status and the possible development in the graph.

START

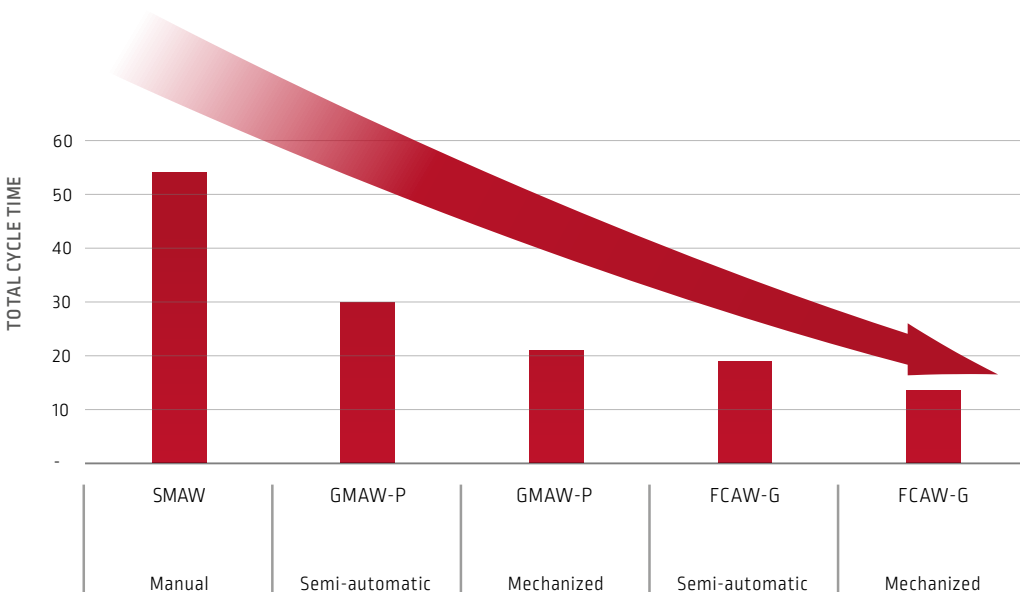
DATA



IMPROVE YOUR TOTAL CYCLE TIME PER JOINT BY INCREASING YOUR DEPOSITION RATE



REDUCE YOUR PRODUCTION COSTS BY INCREASING YOUR OPERATING FACTOR



INCREASE AUTOMATION AND IMPROVE TOTAL CYCLE TIME PER JOINT



PIPEFAB, ONE MACHINE FROM ROOT TO CAP

Introducing the new pipe and pressure vessel dedicated multi processes welding machine

Breakthrough Arc Performance

From root, to cap, to final fit – the PIPEFAB™ system has you covered with weld modes that have been fine-tuned to deliver breakthrough arc performance specifically for pipe and vessel fabrication.

Industry-Driven Design

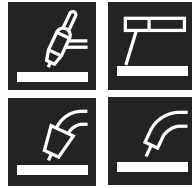
Like the name says, the PIPEFAB™ system was developed specifically for pipe and vessel fabrication. With its Ready-to-Run™ design, every detail was considered in creating the ultimate setup for the pipe and vessel industry.

Straightforward & Simple

Developed to be the fastest, smartest, and easiest solution on the market, the PIPEFAB™ system delivers straightforward and simple digital control with one-click process selection.



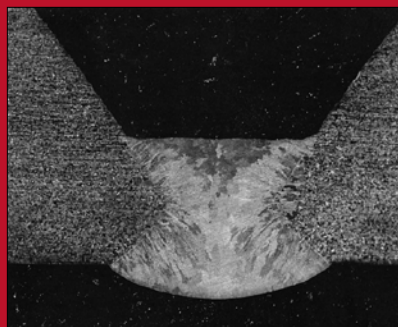
Processes



PIPEFAB™ PROCESS CONFIGURATION SCREEN WITH ARCFX® TECHNOLOGY

New STT®

Industry leading arc stability
Breakthrough travel speeds

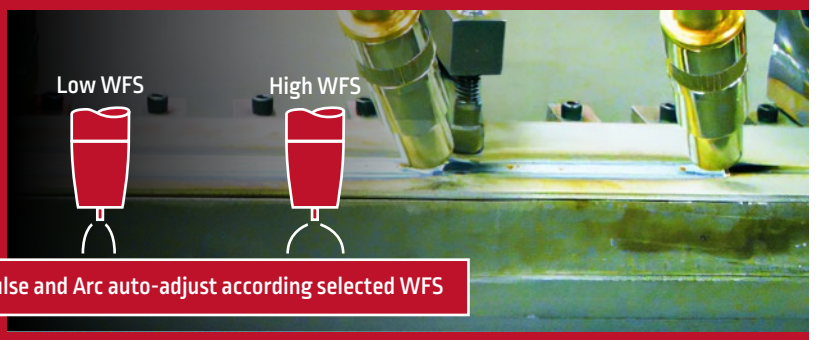


**NO
SENSE LEAD**

**UP TO 55%
FASTER**

Smart Pulse

Wave form tailored for pipe welding
Automatic pulse waveform control
for best arc condition



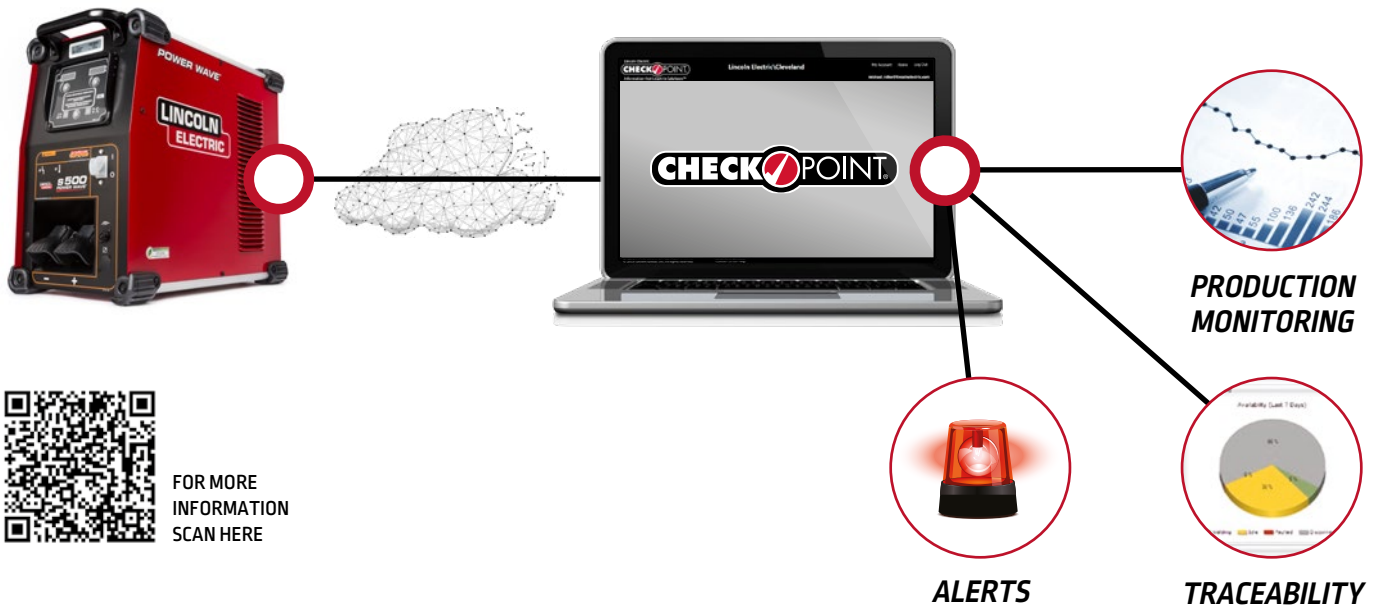
CHECKPOINT™

Good Data – Good Decisions

- More than data collection
- Full production monitoring

With CHECKPOINT System

- Identify the **TRUE COST** of welding
- Evaluate the **TRUE QUALITY** of welding
- Deliver the **TRUE PERFORMANCE** of welding



INTELLIGENCE BUILT IN

All PIPEFAB™ systems come ready to connect to powerful, yet simple-to-use software for configuration, updates and weld data monitoring.

- Remote diagnostics & configuration
- Free and easy software updates –never worry about swapping or storing memory cards.
- CheckPoint® Production Monitoring



IMPLEMENT

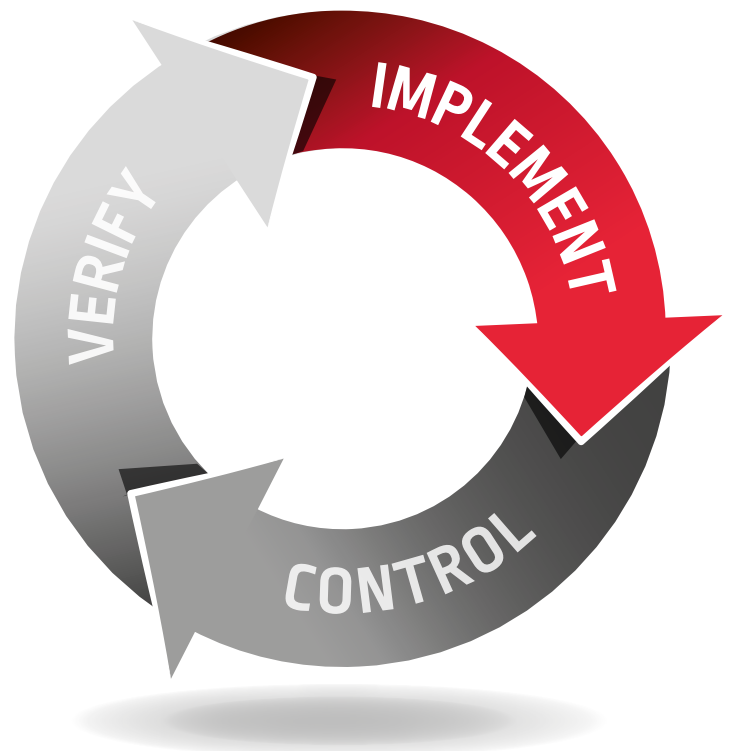
Optimized Arc Performance

- State-of-the-art robust equipment
- Waveform Control Technology™

CONTROL

Process Standardization & Repeatability

- User interface and system management
- Standardize procedures
- User interface lockout to match WPS specifications
- Transfer between machines, stations, plants



VERIFY

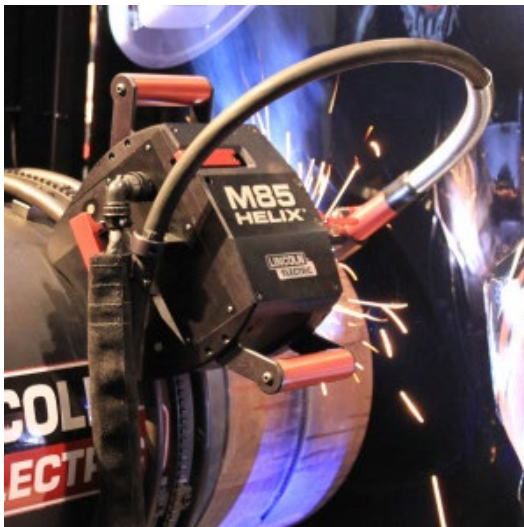
Productivity and Quality Monitoring

- Real-time data
- Productivity measures
- Quality measures
- Embedded tools
- Data your way – stand alone or system-of-systems



A MULTI-PROCESS WELD HEAD DESIGNED FOR PIPE AND FLAT TRACK WELDING

Operator pendant, Advanced Process Module, STT® Process Module, 15' or 25' welding torch, multiple pendant cable lengths, multiple power supply options, custom track rings



SYSTEM OPTIONS

- GMAW
- GTAW
- Combination GMAW/GTAW
- Hot Wire GTAW

OPTIONS

- Multiple wire feeders for feeding in either direction
- Magnetic arc oscillation to magnetically stir the puddle
- FeatureKey software to secure weld programs



BENEFITS

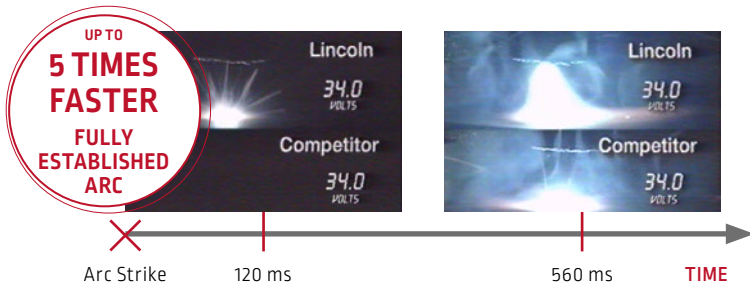
- Base equipment does not change between processes
- Upgrading to another process doesn't require a new capital expense purchase
- A precision system that is perfect for TIG welding with the speeds needed for MIG welding
- Can be set up as: orbital, flat track, or as a 1G welding solution

TRAINING

- One system control with multiple welding options
- Operators trained for one process are already familiar with the controls
- Designed for similarity between processes for intuitive and user-friendly control
- Icon based controls for international deployment

THE NEXT DIMENSION IN PREMIUM WIRES

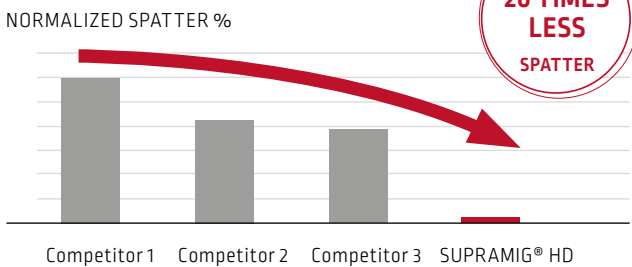
FASTER ARC ESTABLISHMENT



USER ADVANTAGES:

- Helps reduce start defects such as ignition spatters
- Reduced start defects such as cold lap, porosity
- Stable arc while welding

LOW SPATTER LEVEL

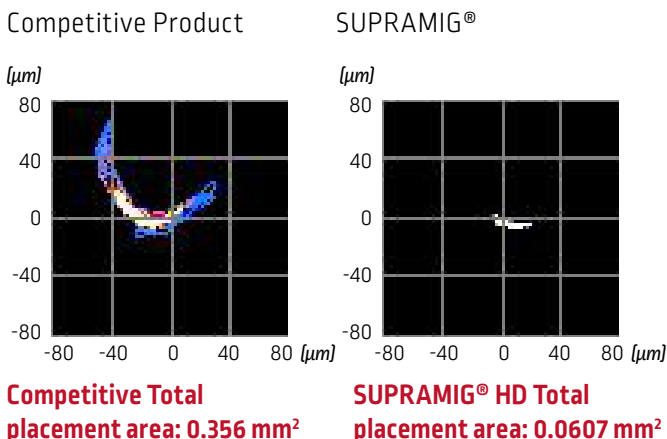


USER ADVANTAGES:

- No components to rework
- Reduced change over/nozzle cleaning cycles
- Reduced jig and tools cleaning frequency
- Improved life of contact tip and nozzles and consistent gas coverage

WIRE PLACEMENT ACCURACY TEST

Wire placement test done with 1.2 mm wire with 40° neck torch and 10 m/min wire feed speed



WE PRODUCE OUR STAINLESS STEEL SOLID WIRES

Our manufacturing facility in Nijmegen, Netherlands has over 70 years of experience producing high quality electrodes, cored and solid wires. We have recently invested in a state-of-the-art, fully automated production facility that manufactures premium stainless steel MIG/MAG, TIG & SAW wires.

Narrow product specifications combined with the industry's most extensive production and quality control processes help produce the unparalleled welding performance and consistency of Lincoln Electric's unique stainless steel solid wires.

FLUXOFIL® – MORE THAN 50 YEARS OF EXPERTISE

FLUXOFIL® seamless copper coated wires are widely applied in industry for welding of Re 355-890 MPa steels.

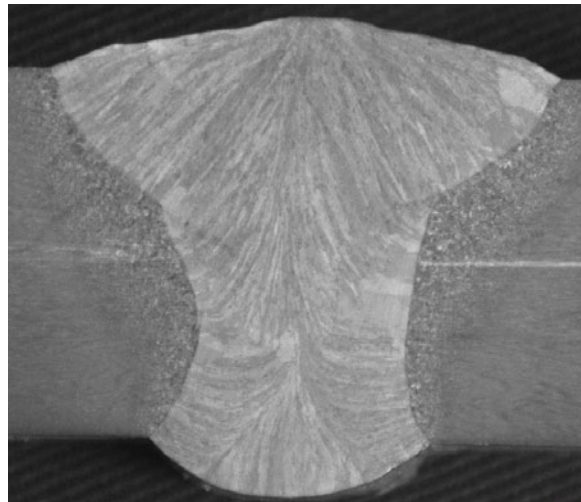
FLUXOFIL

- Resistant against harsh storage conditions
- Outstanding wire feeding combined with stable arc
- Low hydrogen and reduced risk of cold cracking
- Excellent slag removal and regular bead appearance
- Superior welding productivity
- Consumables for manual and mechanized welding

Product Name	Welding Process	EN ISO
Carbon Mn Steel		
SUPRAMIG®	GMAW	G46 4 M21 3Si1 / G42 3 C1 3Si1
OERLIKON CARBOFIL 1A GOLD	GMAW	G42 4 M21 3Si1 / G42 3 C1 3Si1
SUPRAMIG® ULTRA	GMAW	G50 5 M21 4Si1 / G46 3 C1 4Si1
OERLIKON CARBOFIL 1A GOLD	GMAW	G46 4 M21 4Si1 / G46 3 C1 4Si1
OUTERSHIELD® E71E-H	FCAW-G	T46 3 P M 1 H5
FLUXOFIL® 14 HD	FCAW-G	T46 3 P M 1 H5
OUTERSHIELD® 71MS-H	FCAW-G	T46 4 P C 2 H5
FLUXOFIL® 19 HD	FCAW-G	T46 3 P C 1 H5
Stainless		
LNM 308LSi	GMAW	G 19 9 L Si
LNM 316LSi	GMAW	G 19 12 3 L Si
COR-A-ROSTA® P304L	FCAW-G	T 19 9 L R C/M 3
SUPERCORE® 308LCF	FCAW-G	T 19 9 L P M 2
COR-A-ROSTA® P316L	FCAW-G	T 19 12 3 L P C/M2
SUPERCORE® 316LCF	FCAW-G	T 19 12 3 L P C/M2*



WELDING RELIABILITY



SAME MECHANICAL PROPERTIES

The weld quality is crucial in Process Piping, and poor weld quality may impact your production time and cost. Mechanized welding can provide great benefits in these areas by helping improve repeatability, traceability, welding time, soundness and weld appearance.

USER ADVANTAGES

- WPS Adherence
- Consistent Welding parameters application
- Parameters Limits control
- Traceable Weld Data





EXPERTS' SUMMARY

In the world of welding, we face many challenges on a daily basis. The welding industry is extremely competitive, with specialist companies developing and introducing new innovative solutions to achieve greater market share and become a market leader in the welding field.

Components for pipework systems, especially in the power and process industries, are becoming increasingly complex. Customers in those industries are demanding high quality welds to ensure the service life of components, and have implemented acceptance criteria to confirm volumetric soundness. Customers are also implementing new inspection equipment to check weld quality. To meet these demands, companies will need to focus on their ability to provide consistent quality welds for all of their projects.

A shortage of skilled high-integrity pipe welders has had a major effect on a global scale. While the industry continues its efforts to replenish this valued and much needed skill base, companies are looking at other solutions to fill the gap in several industry segments.

One such solution is mechanized welding systems, which can provide piping companies with many benefits. Mechanized welding can help companies achieve the weld quality consistency, increased productivity, procedural adherence and cost reduction that have become vitally important to their success.

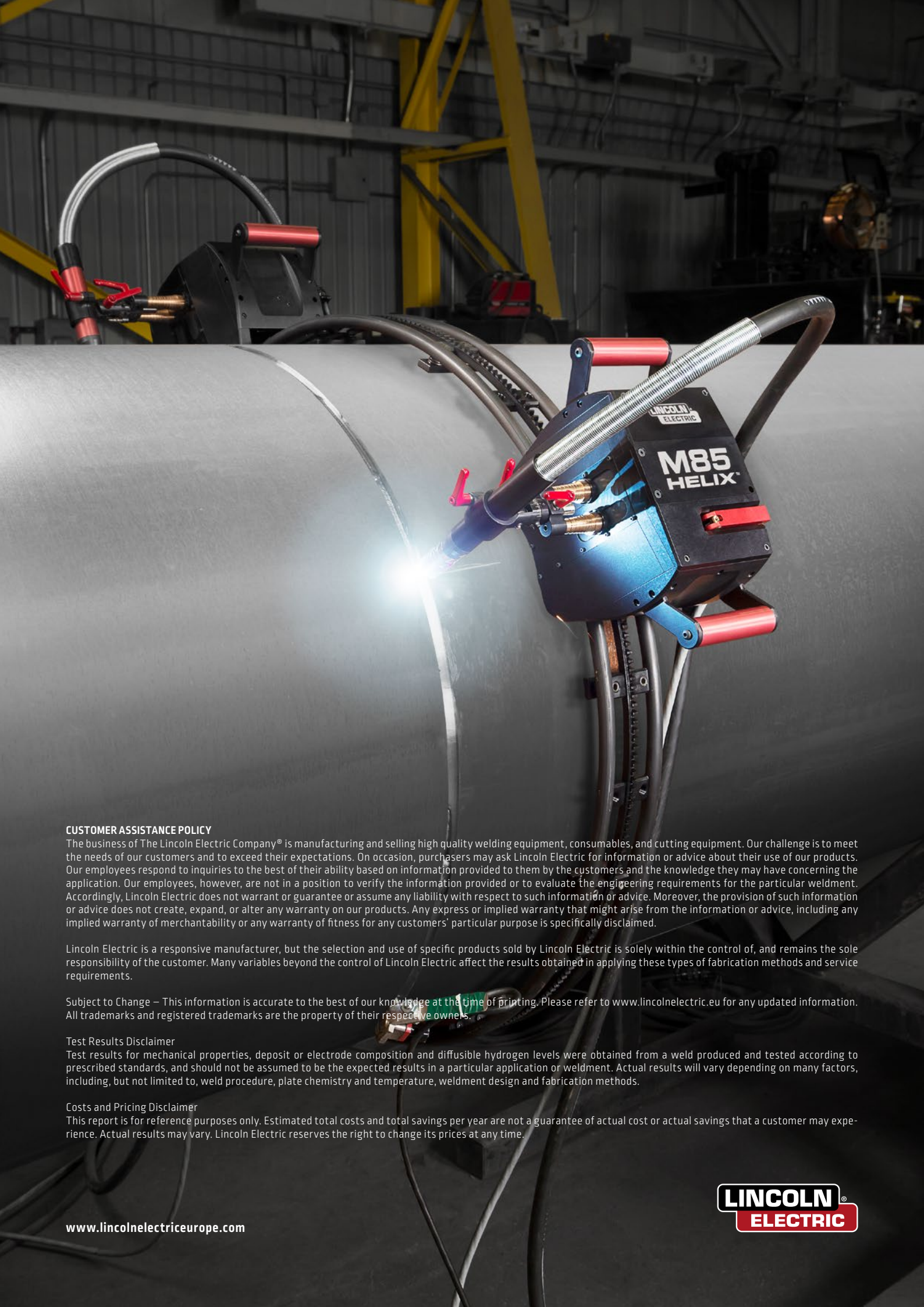
Lincoln Electric has been developing a range of multi-process mechanized welding systems, and is now in a position to offer mechanized welding solutions. These solutions are designed to help meet the tough demands of the power and process piping industries. The ability to offer equipment, consumables, training, and provide our customers with the highest level of technical support, gives Lincoln Electric the chance to be the single source for a complete packaged solution.



**BOOK AN
APPOINTMENT
NOW!**

Do you want to improve your productivity and reduce your welding cost by up to 50%?

Please ask for an appointment in order to estimate your savings.



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.

Subject to Change – This information is accurate to the best of our knowledge at the time of printing. Please refer to www.lincolnelectric.eu for any updated information. All trademarks and registered trademarks are the property of their respective owners.

Test Results Disclaimer

Test results for mechanical properties, deposit or electrode composition and diffusible hydrogen levels were obtained from a weld produced and tested according to prescribed standards, and should not be assumed to be the expected results in a particular application or weldment. Actual results will vary depending on many factors, including, but not limited to, weld procedure, plate chemistry and temperature, weldment design and fabrication methods.

Costs and Pricing Disclaimer

This report is for reference purposes only. Estimated total costs and total savings per year are not a guarantee of actual cost or actual savings that a customer may experience. Actual results may vary. Lincoln Electric reserves the right to change its prices at any time.