



DRIVERS & TRENDS

Higher steel grades and bigger wall thicknesses are needed for the pipeline market. Same is true for construction pipes welded with multi layers. Meanwhile, X80 is typical in most pipe mills while X100 and X120 are gaining momentum.

APPLICATION REQUIREMENTS

Pipes are usually continuously tack welded with the buried arc process (GMAW) and afterwards submerged arc welded with one or multi layers on the inside and outside.

Highest repeatability at lowest defect rate is essential to pipe production. Therefore, quality control is an important factor for this industry.

Matching the material properties requires optimized flux and wire combinations as well as welding procedures matching the heat input.

Details of quality requirements vary depending on the type of pipe (spiral or longitudinal) and the usage (water pipeline, construction pipe or gas/oil pipeline), but a quality higher than grade B of ISO5817 is important to most applications.

LINCOLN SOLUTION

With Uhrhan & Schwill Schweisstechnik GmbH, Lincoln Electric offers the latest technology from the market leader in multiple arc welding.



- ✓ Turnkey pipe welding solution, including tack welding and multi-arc submerged arc welding
- ✓ Fully automated process and machinery
- ✓ Customized welding equipment designed to meet the production flow and special needs of the customer
- ✓ Accessory equipment fully integrated into the welding machine
- ✓ Proven power source technology including Power Wave® AC/DC 1000® SD sources with Waveform Control Technology®
- ✓ Traceability of each weld according to ISO9001
- ✓ Hydrogen controlled flux and wire combinations with excellent slag removal and improved undercut or copper crack resistance
- ✓ Welding experience in multiple arc welding since 1964



PIPE MILL INDUSTRY

EQUIPMENT

MULTI ARC WELDING HEAD



To address the special needs of multiple arc welding, it is essential to have the ability to adjust all the mechanical setup parameters.

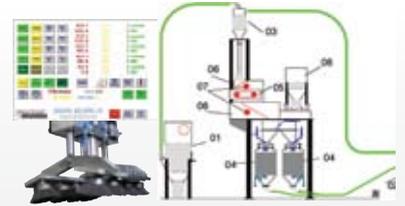
It is also important to have the most advanced design standards for highest repeatability of serial production. The Uhrhan & Schwill welding head design meets these requirements and has been refined with more than 45 years of experience

POWER SOURCES



Lincoln Electric power sources include standard rectifiers (Idealarc® DC-1000) or transformers (Idealarc® AC-1500) and inverter technology (Power Wave® AC/DC 1000® SD) designed for high current capability at high duty cycles. With the Power Wave® AC/DC 1000® SD, Lincoln electric is offering the second generation of a fully digital solution for submerged arc welding. Waveform Control Technology® can be used to increase deposition rate and welding speed or to decrease heat input in order to be prepared for higher steel grades.

AUTOMATION & PERIPHERY EQUIPMENT



The Uhrhan & Schwill Z5 control system is based on a digital control with integrated data recording for full traceability of every welded pipe. Operation is controlled with a touch screen monitor which can be adapted to the customer needs.

Flux recovery system, seam tracking or grounding equipment can be integrated with the machine as needed, and can be controlled through the touch screen HMI as well.

CONSUMABLES

FLUX	WALL THICKNESS	GENERAL DESCRIPTION	TYPICAL APPLICATION	STEEL GRADE	WELDING TECHNIQUE	SPECIAL COMMENTS	PRODUCT COMBINATIONS	FLUX TYPE	BASICITY INDEX
780	< 15 mm	Fast freezing flux ideal for spiral pipe fabrication and for double-joining pipe, even on small diameters.	Spiralpipe or Linepipe	up to X70	Single or Multiple Wire (up to 3)	- Best choice for small diameter pipe	L-61 (S2Si) no impacts LNS140A (S2Mo) for impacts at -20°C	AR/AB	0,7
761	< 20 mm	Low melting flux with good bead wetting characteristics. Good for use on long seam applications or larger diameter spiral applications.	Spiralpipe or Linepipe	up to X70	Single or Multiple Wire (up to 3)	- Most commonly used pipemill flux	L-61 (S2Si) for no impacts LNS140A (S2Mo) for impacts at -20°C	MS/CS	0,9
995N	> 15 mm	Medium viscosity flux resulting in low bead profiles and high current carrying capability.	Linepipe only	up to X90	Multiple Wire (up to 5)	- Low nitrogen weld deposits - Superior arctic grade impact toughness when used with LNS140TB	LNS140A (S2Mo) for impacts at -40°C LNS140TB(S2MoTiB) for impacts at -50°C	AB	1,3
998N	6-50 mm	High viscosity flux providing low defect rates in a wide variety of applications. High current carrying capacity will handle thick wall pipe.	Spiralpipe or Linepipe	up to X90	Multiple Wire (up to 5)	- Weld metal properties similar to 995N - Highly resistant to undercutting - Improved copper cracking resistance	LNS140A (S2Mo) for impacts at -40°C LNS140TB(S2MoTiB) for impacts at -50°C	AB	1,4
P223	> 10 mm	An industry standard for use in spiral applications where impact toughness is beyond what can be achieved with 780 or 761 fluxes.	Spiralpipe	up to X70	Single or Multiple Wire (up to 3)	- Will handle small diameters and double-joining -Excellent impact toughness when used with LNS140A	L-61 used for sour service LNS140A (S2Mo) for impacts at -30°C	AB	1,5
SPX80	8 - 30 mm	Spiral pipe flux for use in one and two-step spiral pipe applications.	Spiralpipe	up to X80	Multiple Wire (up to 5)	- Smooth bead appearance on ID and OD - Low diffusible hydrogen minimizes coating defects	LNS140A (S2Mo) for impacts at -30°C	AB	1,3

WIRE	TYPICAL APPLICATION
LNS 129 (L-61)	For up to x65 grade where impacts are not required. For low hardness requirements for sour service.
LNS 140A (L-70)	For up to x80 grade on longitudinal seam welds. For up to x70 grade on spiral pipe seam welds due to high interpass temperatures
LNS 140ID	For ID weld up to x80. Best solution for low hardness requirements for sour service
LNS 140TB (LA-81)	For up to x90 grade where very low temperature toughness is required. Often used with LNS140A or LNS140ID on first pass side.