A close-up photograph of a narrow gap welding process. A bright, intense blue-white light emanates from the point where a welding torch meets a narrow gap between two metal plates. The surrounding area is dark, with some blue light reflecting off the metal surfaces.

Narrow gap welding

Revolutionised thick plate welding

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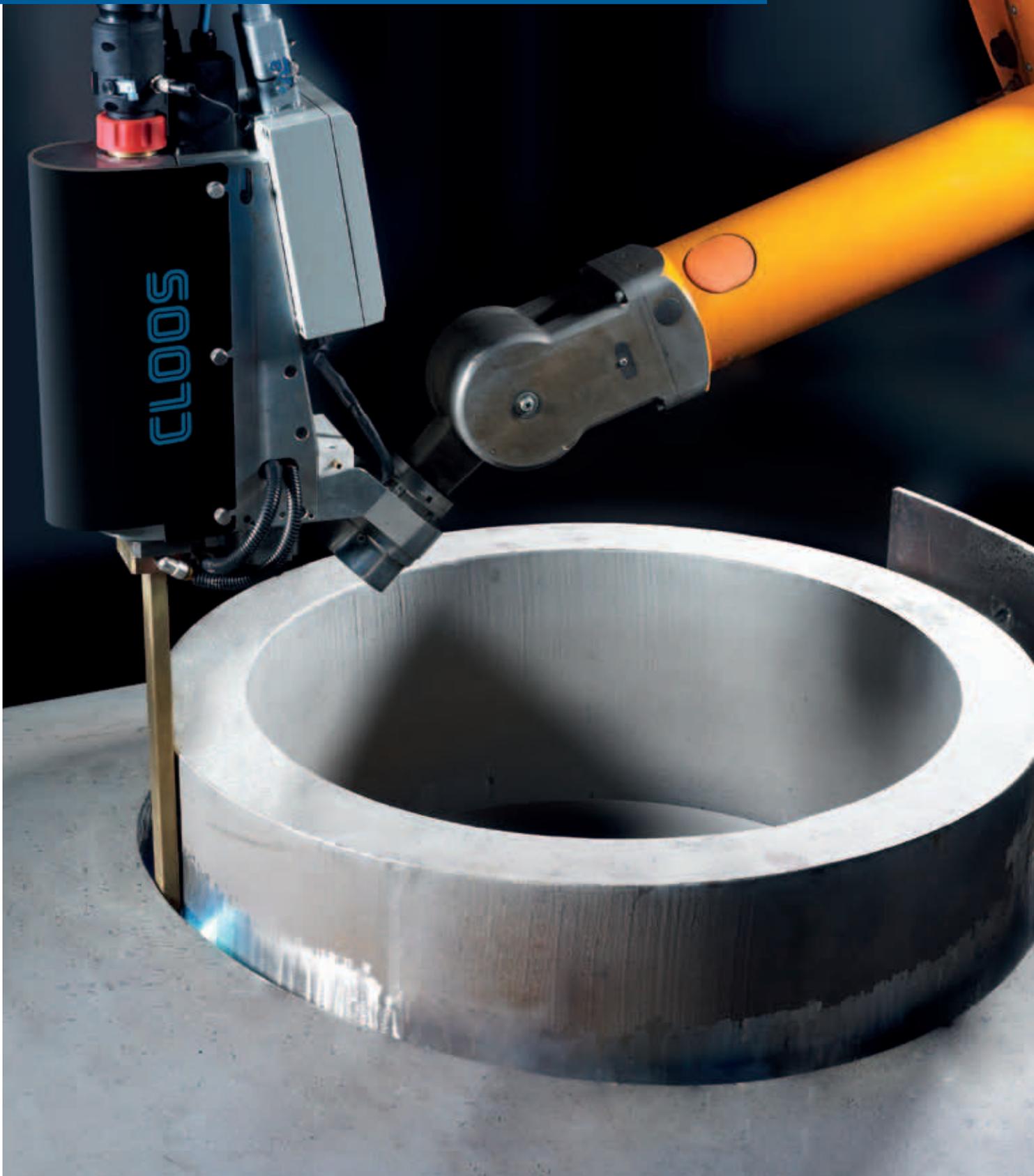


**"You need a clear vision of what you want to do
- and you have to stick to it."**

Roger B. Smith



Automated narrow gap welding



Narrow gap welding for applications on thick plate

Users can now dispose of the CLOOS MIG/MAG Narrow gap technology, an automated welding process variant using industrial robots. The process offers a particular economic efficiency for welding thick-walled component parts.

The usual V-seam preparation is substituted by the narrow gap seam with parallel seam flanks and a gap width of only 20 mm even in the case of 300 mm wall thickness. For the preparation of the seam edge the quality of the conventional flame cut is sufficient.

Thus, the weld seam volume can be reduced by about 60% in comparison to the conventional weld seam preparation. This enables the user to significantly reduce welding time and provides a considerable potential saving with regard to the filler material, shielding gas and power consumption.

The basis of the narrow gap technology is the rectangular narrow gap blade with a length of up to 300 mm, which guides the wire electrode, the shielding gas and the water coolant. The weld seams with the typical constant seam structure meet the highest quality demands. The relatively low energy supply during narrow gap welding provides special advantages even for heat sensitive materials such as fine grained structural steel.

Advantages

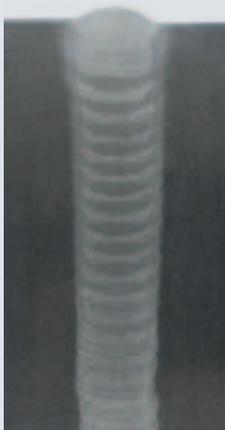
- Reduction of the welding time
- Narrow gap: Low filling volume
 - Reduction of resources: Energy, wire, gas
- Shorter machine running times
 - Less distortion
- Less cut-off during weld preparation
 - Shorter component processing time
- Highly automated production system
 - Flexible because of robot guidance
 - Integrated arc sensor
- Application of different welding processes
 - Cold Weld, Speed Weld, Rapid Weld, etc.
 - Optimum welding results
- Increase in efficiency

Advantages – Narrow gap welding on robot

- Programming of the functions via the robot controller
- Welding of circular joints
- Welding of contour welds
- Joining of different joints on a component
- Arc sensor for gap centre guiding
- Arc sensor for the height set value

65% Less energy, wire and machine running time

Technologies



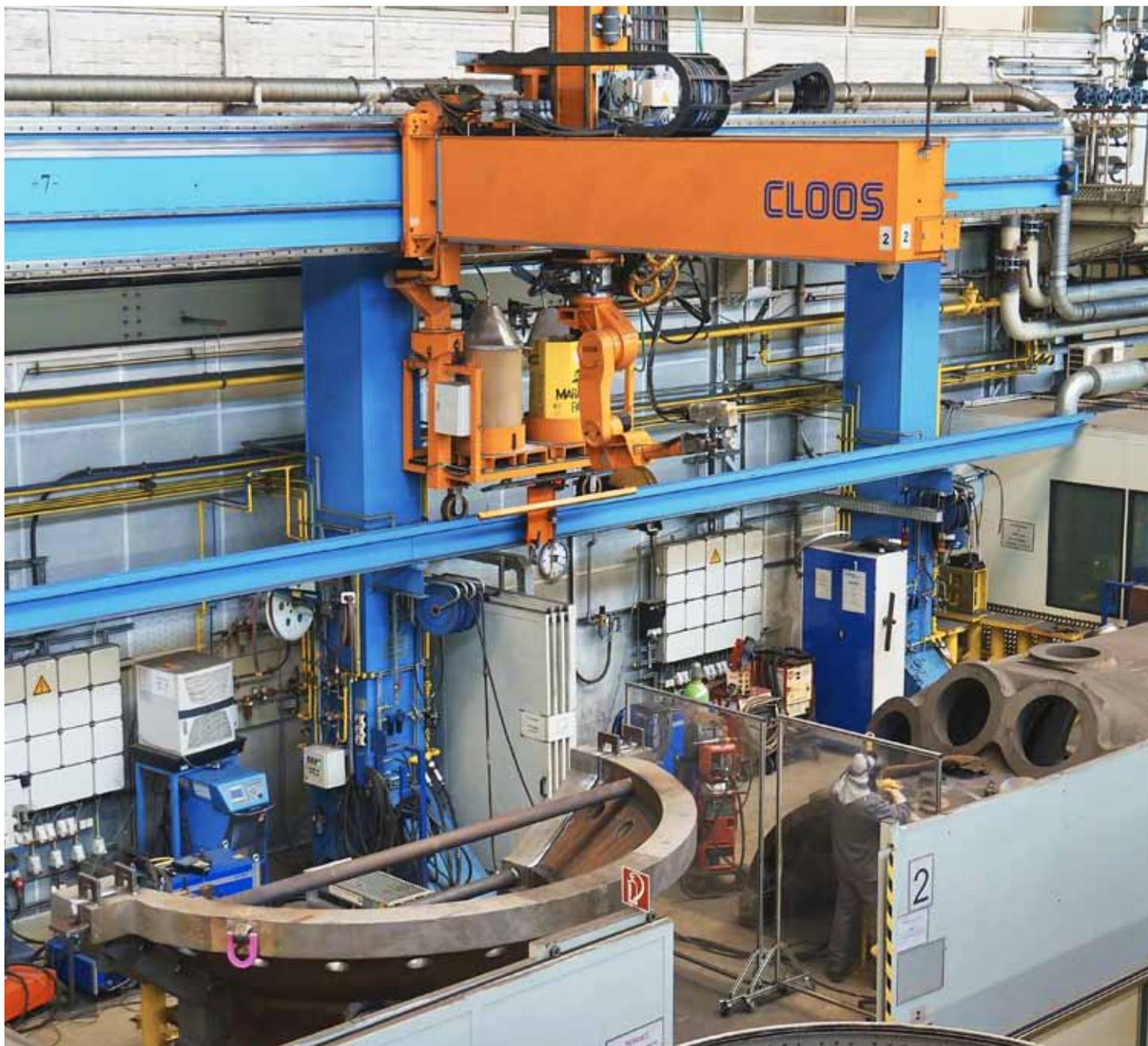
Weave bead technology

- Perfect penetration
- Plate thickness / gap depth: 165 mm
- Layers: 26



Stringer pass technology

- Perfect penetration
- Plate thickness / gap depth: 100 mm
- Layers: 21
- Beads: 61



Task

It is much more favourable to use the narrow gap technology which allows much lower joint cross-sections – see draft. Compared to the V joint, only a third of the welding deposit is required. Even in the case of wall thicknesses of 300 mm the gap width is only 20 mm. However this requires a special technology; the normal torch cannot be used. Instead a narrow gap blade with rectangular cross-section is used which guides the wire electrode, welding current, shielding gas and water coolant. To achieve reliable side wall penetration, the angled current contact tube is rotated from time to time; short dwell times at the side walls guarantee fault-free weld seams.



The deposition rate of the MIG/MAG arc process can be up to 10 kg/h (steel). Compared to the conventional welds the total heat input can be kept low.

Operation of the new CLOOS narrow gap welding process is fully automatic on the robot. All relevant path and welding parameters are stored in the programs of the QIROX® Controller.

The welding head contains a position controlled pivot drive with an angle of rotation of 360°. A wire drive integrated in the head ensures uniform and reliable wire feed even during prolonged welding times. In combination with the robot a variety of sensor systems are available for path correction on workpieces with certain tolerances.

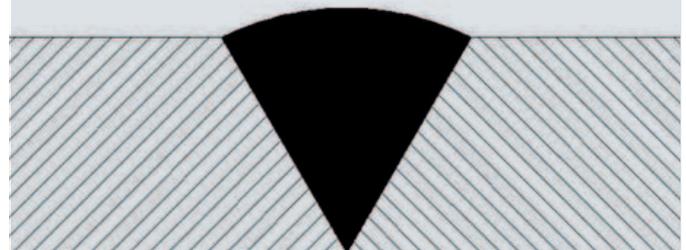
Overview of narrow gap welding

Technical data

- Applications
 - Plate thicknesses of more than 35 mm
- Characteristics
 - High welding speed
 - Small opening angle
 - Less welding layers and filler material
 - Low heat input and distortion
- Material
 - Steel

Functions

- Weave bead technology
 - adjustable oscillation width
 - adjustable oscillation frequency
 - adjustable flank holding time
- Stringer pass technology
- Forward/backward welding
- Gap illumination during set-up
- Double collision protection
 - CLOOS Robot collision sensor
 - Blade collision sensor, diagonal



V-seam preparation



Narrow gap weld preparation





Project description

For many years, Siemens has belonged to the group of leading manufacturers in the world with innovative gas turbines for power stations.

In order to be able to manage the greatly increasing demand and at the same time, improve the working environment for employees, Siemens is, for the first time, using narrow gap welding by means of robots for handling huge turbine housings, which has brought about readiness for production of the group in collaboration with the welding specialists CLOOS from Haiger.

Technical information

- 80% saving of welding material and working time compared to conventional V weld
- 30 m long CLOOS gantry system with two robots for 4 working areas
- Screen monitoring of the robots during welding



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Providing added value for our customers! This objective drives our 700 motivated employees to achieve maximum performance. We are constantly raising our bar by pushing ourselves to provide innovative welding processes and solutions that will contribute to the long-term commercial success of your company!

Our process competence is at the forefront in welding and cutting of various ferrous and non-ferrous metals.

We offer our customers individual solutions which are optimised and adapted specifically to your product and production requirements. Leadership and competence equals process automation and welding at its best.



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With our QINEO®, the new generation of welding machines for manual and automated applications, and QIROX®, the system for automated welding and cutting, our product range covers the entire spectrum of arc welding technology. Our product portfolio includes intelligent software, sensor and safety technology solutions – all of which are customised to meet your specific needs and requirements! Cloos provides full service solutions – all from a single source!

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- Power sources
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- Connection cable assemblies
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The logo for CLOOS, featuring the word "CLOOS" in a bold, blue, sans-serif font. The letters are stylized with a slight shadow or outline effect.

Weld your way.