

Improved quality in manual shielded metal arc welding

An analysis module with integrated thermal camera, detects the welding point continuously measuring the heat input and calculating the t8/5 time. The worker receives instant feedback on the current t8/5 time and can adjust it accordingly. The process simplifies the welding process for the worker and results in a much better welded joint with less training. Immediate feedback e.g. to varying dimensions of the workpiece during welding becomes possible.



So far there was no solution within the process

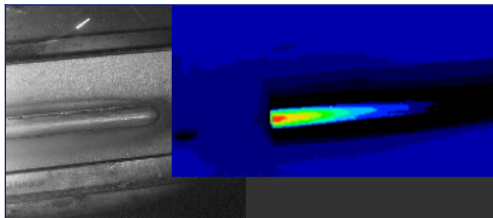
Known solutions for compliance with the distance energy use the measurement of the welding speed. Unlike the electrical power, it cannot be controlled by the welding machine but only by the welder.

- 01 Real-time analysis of the t8/5 time within the different types of electric arc welding
- 02 Possibility of giving direct feedback to the user (by vibration and other types of signals)

- 03 Increasing quality of the welded joint with optional digital video-documentation
- 04 High quality results even for less experienced welders

REFERENCES:

- ↓ Patent details



The optical camera traces landmarks on the welds joint (left) to reference the movement, while the thermal camera (right) is used to calculate the cooling time.

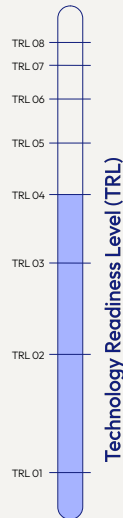


CHALLENGE

The applied energy plays a decisive role for the strength of the joint. Data sheets or preliminary tests provide information on the distance energy to be applied and the matching t8/5 time. Geometry, dimensions and temperature of the workpiece require defined adjustments to the welding speed so that the quality of the joint remains constant over the length of the weld. Previous measurement methods did not provide practicable solutions for everyday use.

INNOVATION

The combination of two different types of cameras provides detailed information about the quality of the welded joint. The thermal camera system tracks points in the center of the weld and records the cooling as a function of distance. An optical camera uses "landmarks" in the area surrounding the weld to track the movement of the handpiece over the workpiece and measures the velocity in the weld spot. A feedback loop informs the worker about the current speed. This loop has not yet been implemented in the system.



01 Basic principles observed · 02 Technology concept formulated · 03 Experimental proof of concept · 04 Technology validated in lab · 05 Technology validated in relevant environment · 06 Technology demonstrated in relevant environment · 07 System prototype demonstration in operational environment · 08 System complete and qualified



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