



SAT™ Process Boosts Deposition Rate by 47% For Soil and Asphalt Compacting Equipment

- ESAB Swift Arc Transfer (SAT™) increases deposition rate by 2.8 kg/hr.
- Manufacturing capacity increased by 36%, costs lowered by 65%.

Situation

A major manufacturer of soil and asphalt compactors was robotically welding mild steel rollers with plate thicknesses up to 15 mm. Not fully satisfied with results from spray transfer welding with a 1.2 mm solid wire, the manufacturer contacted the ESAB Value-Added Engineering (VAE) to recommend improvements.

Complication

The new solution could not increase product cost and had to maintain drum concentricity. Weld seams for a hydraulic fluid reservoir needed “watertight” integrity.

Solution

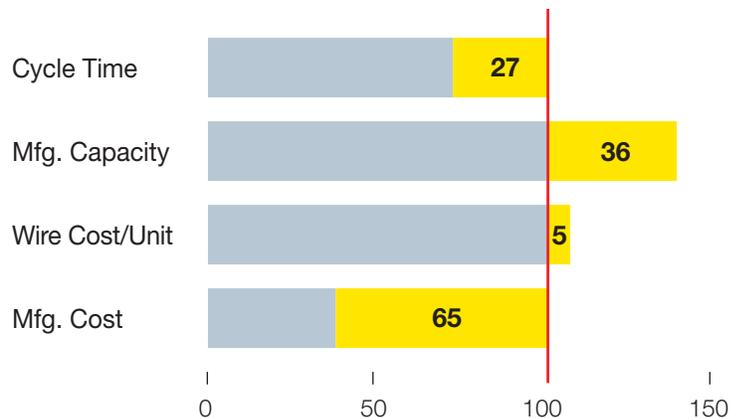
Implement ESAB’s Swift Arc Transfer (SAT™) welding process on two robotic welding stations, one for fillet welds in PB (2F) and PA (1G, 1F) positions and one for butt joints in PA position. The ESAB system included the Aristo® MIG 5000iw inverter, Robofeed 3004 wire feeder, U8₂ control and OK AristoRod 12.50 non-copper coating wire in 1.0 mm diameter.



Results

As shown in Fig. 1, SAT delivered impressive metrics across the board. Combined with the other benefits of the ESAB system, the manufacturer lowered roller production costs by 65%.

Fig. 1 – SAT Improvements



BENEFIT #1

High Welding Productivity

Because SAT increases current density through use of higher welding parameters with a smaller diameter wire, it offers higher deposition rates than other MIG/MAG processes. Fig. 2 summarizes the parameters and improvements for the roller.

Fig. 2 – SAT Parameters for PA welding position

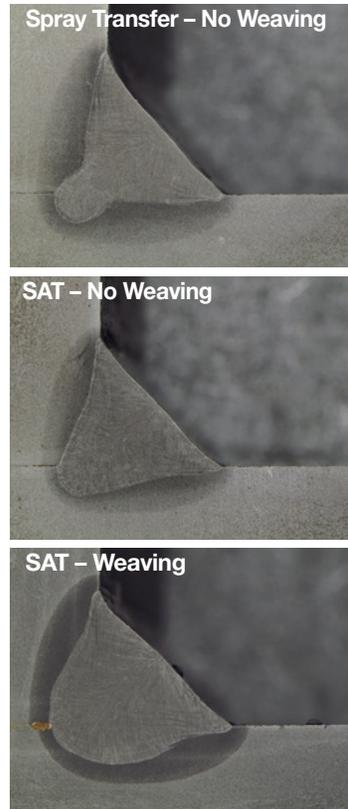
Torch guiding	Weaving
Wire diameter	1.0 mm
Wire feed speed	25.0 m/min
Current	375A
Voltage	35.0
SAT deposition rate	8.8 kg/hr
Spray arc deposition rate (1.2 mm wire)	6.0 kg/hr
SAT improvement	47% (2.8 kg/hr)

BENEFIT #2

Superior Penetration Profile

Heavy-wall applications typically require a weaving procedure with “through-the-arc” seam tracking. As shown in Fig. 3, SAT delivers a more rounded weld bead for better throat penetration and excellent sidewall penetration in weaving and non-weaving applications. Compared to the “finger” of penetration for spray transfer, SAT achieved the “watertight” welds required with a higher degree of confidence.

**Fig. 3
SAT Penetration Profile**



BENEFIT #3

Better Uptime

Outside of the SAT synergic lines pre-programmed in the U8₂ control, the most critical component of SAT is OK AristoRod 12.50. This non-copper coated wire with advanced surface characteristics provides consistent welding performance, a stable arc with low feeding force, trouble-free feedability, excellent arc ignition and an extremely low spatter level.



Traditional 70S-6 wires use a copper coating to improve feeding. Contrary to popular belief, the coating does not improve current transfer, reduce tip wear or protect against rust. The weakness of a copper coated wire is that particles chip off and contaminate the feeding system, gradually clogging the liner and contact tip. As resistance builds up due to clogging, the wire eventually burns back to the contact tip — which causes unplanned downtime, a very undesirable occurrence in a robotic application.

Because OK AristoRod is a non-copper coated wire, it generates far fewer particles and enables a longer run time



between scheduled maintenance and liner and tip replacement. While the 1.0 mm OK AristoRod commanded a 5% premium compared the previous 1.2 mm solid wire, the equipment manufacturer

confirmed that OK AristoRod's performance played an essential role in lowering welding costs by 65%.



Contact your ESAB sales representative to learn more, or visit [esab.com/mobilemachinery](https://www.esab.com/mobilemachinery)



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