



# **ESAB Swift Arc Transfer™ MAG welding at very high travel speed**

THE ULTIMATE HIGH PRODUCTIVITY PROCESS.



**STRENGTH THROUGH COOPERATION**

# ESAB Swift Arc Transfer (SAT™)

ESAB Swift Arc Transfer (SAT™) is a high productivity MAG process that utilises AristoRod™ non-copper coated wires at travel speeds well beyond the limits of normal spray arc welding.

SAT™ produces flat welds with a good penetration and without undercut. An

additional advantage is the low heat input, resulting in less deformation. SAT™ is developed for robotic, automated and mechanised welding. It is suited for fillet and overlap welds in thin to thick plate, in downhand positions.

SAT™ is based on the use of ESAB OK AristoRod™ non-copper coated MAG wire with Advanced

Surface Characteristics - the benchmark product in the European transportation industry. The absence of contamination of the feed system with copper particles and the special surface finish results in dependable feeding properties and a

stable arc at high welding currents/wire feed speeds.

OK AristoRod™ non copper coated wire has the advantage over copper coated wires that it does not quickly contaminate the feed system with copper particles.

## ESAB SAT™ brings

### following user benefits:

- **A stable process at very high welding speed.**
- **Excellent weld appearance.**
- **A good weld penetration.**
- **Low heat input and low deformation.**
- **Less post weld labour, due to limited spatter and deformation.**
- **Suited for thin up to thick materials with a single parameter setting.**
- **Easy to implement – common torch positions, normal stickout length.**
- **Very low amount of silicates.**

OK AristoRod is available on 18kg basket spools, but use of Marathon Pac™ octagonal bulk drums (250 or 475kg) is recommended for big savings on downtime for spool exchange and better welding results due to straighter wires.

SAT™ uses ESAB inverter power sources together with the Robofeed 3004 wire feeder for wire feed speeds up to

30m/min in conjunction with U8<sub>2</sub> control unit.

Synergic lines are available for three AristoRod™ wire sizes and various shielding gases.

# Swift Arc Transfer™ – a non exploited arc type

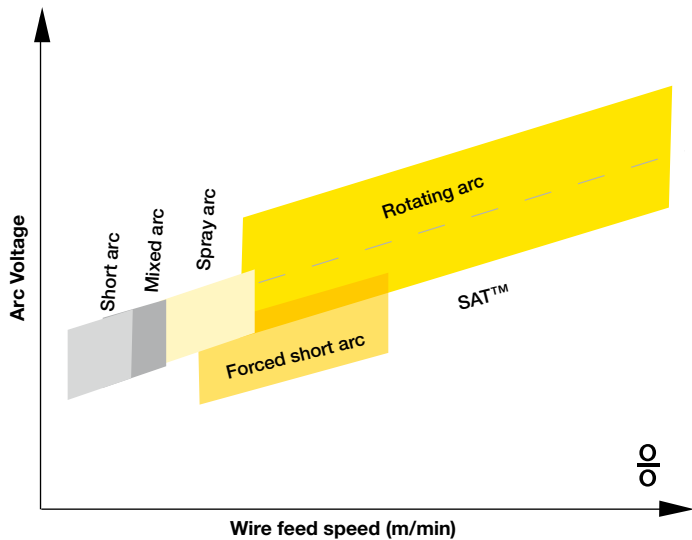


Figure 1: The various arc types that occur in MIG/MAG welding.

Figure 1 shows the various arc types which occur in MAG welding as a function of the arc voltage and wire feed speed (welding current). Short, mixed, spray and rotating arc are arc modes that follow in a natural sequence when the arc voltage and wire feed speed are proportionally increased.

Forced short arc is an arc mode that occurs at wire feed speeds belonging to the spray and rotating arc areas, but at significantly lower arc voltages. The possibilities and benefits of this arc type are well known and applied in industry.

At even higher wire feed speeds, but at lower arc voltage than for the rotating arc, the SAT™ arc is created. This is an area that, until

recently, has been fully exploited for its possibilities for high productivity MAG welding.

ESAB has researched this area extensively and has identified many benefits. Under the heading SAT™, we provide a complete package of equipment, consumables and synergic lines as well as the know-how to implement the process successfully.

The SAT™ process can operate with a range of wire diameters at several levels of deposition rate, as reviewed by table 1.

Table 1. SAT™ parameters for different wire sizes and four deposition rate levels. The yellow area shows the welding current limits. Fillet welds in PB position.

Ø (mm)	0.8	0.9	1.0	1.2	Deposition rate (kg/h)
Wfs (m/min.)	25	20	16	11	5.9
I (A)	220	230	240	230	
Wfs (m/min.)	32	25	20	14	7.4
I (A)	260	270	300	400	
Wfs (m/min.)	35	27	22	15.5	8.1
I (A)	255	285	330	460	
Wfs (m/min.)		30	25	17.5	9.2
I (A)		348	375	500	

Table 2. Welding speed in m/min for various fillet weld sizes in PA or PB position. 30% efficiency factor used for weld reinforcement and spatter.

Deposition level (kg/h)	a=3 (m/min.)	a=4 (m/min.)	a=5 (m/min.)
5.9	0.98	0.57	0.34
7.4	1.23	0.66	0.43
8.1	1.35	0.72	0.47

# Excellent results in thin to thick plate



Table 2. Penetration profiles in thin plate – overlap welds, 2mm plate.

Wire diameter	0.9 mm	0.9 mm
Shielding gas	92%Ar/8%CO <sub>2</sub>	92%Ar/8%CO <sub>2</sub>
I (A)	260	240
Wfs (m/min.)	25	20
V (cm/min.)	155	140
Stickout (mm)	18	18

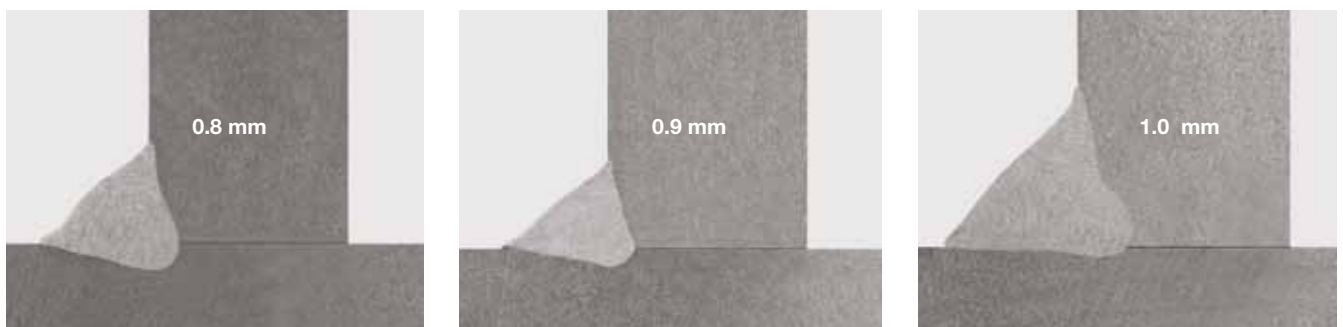
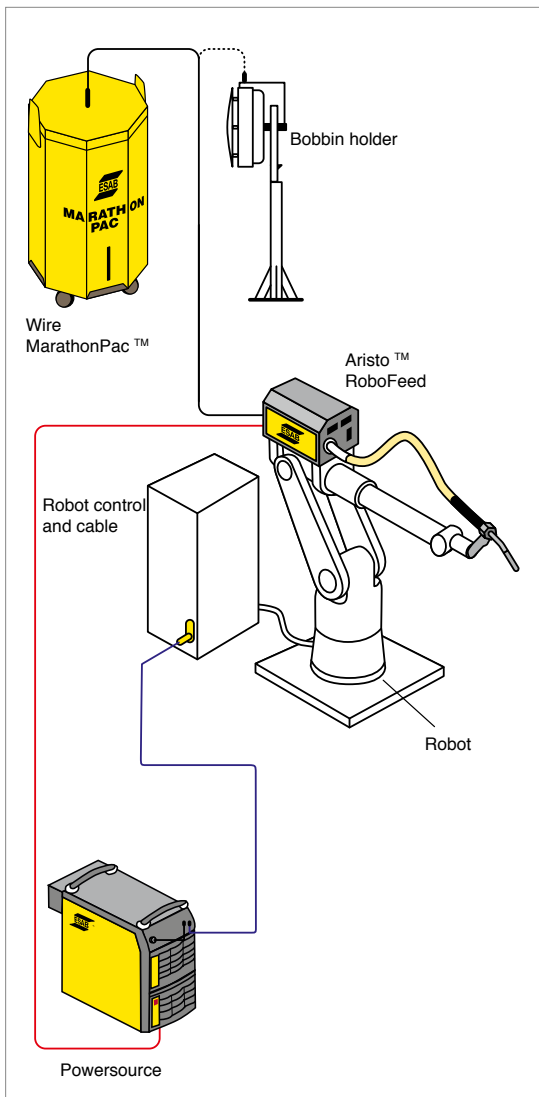


Table 3. Penetration profiles in 10mm plate – a=3 fillet welds. Shielding gas Mison 8.

Wire size	0.8 mm	0.9 mm	1.0 mm
Current (A)	210	260	316
Wire feed speed (m/min.)	20	20	20
Travel speed (cm/min.)	75	95	125
Deposition rate (kg/h)	4.7	6.1	7.4
Stickout length (mm)	19	19	20

# The optimal SAT™ arrangement



## The ultimate welding technology for robots

ESAB's Aristo U82 robot package is a complete set of welding equipment and consumables, based on ESAB's latest digital power source technology. The package consists of:

- The Aristo™ Mig 5000iw inverter or ESAB Mig 4002, 5002 or 6502 choppers.
- The Aristo U8<sub>2</sub> control unit with SAT synergic lines or The Aristo W8<sub>2</sub> interface for different robot brands.
- The RoboFeed 3004w ELP encapsulated wire feeder with up to 30 m/min. wire feed speed.
- Cable packages.
- The Marathon Pac bulk drum with robot quality welding wire and optional bobbin holder.

The robot package can be installed to enable SAT welding on newly built robots, but also for retrofit of existing installations.

### ESAB SAT™ high speed welding (ESAB OK AristoRod)

**Shielding gas** 4% O<sub>2</sub> in Argon  
8% CO<sub>2</sub> in Argon  
18% CO<sub>2</sub> in Argon

**Stickout** 16-20 mm

**Contact tips** CuCrZr

**Torch position** 10° - 20° Pushing  
30° - 55° From horizontal

**Electrode extension** 16 - 20mm

**Joint types** Overlap welds  
Fillet welds  
V-joints

**Welding positions** PA, PB



# World leader in welding and cutting technology systems



ESAB operates at the forefront of welding and cutting technology. Over one hundred years of continuous improvement in products and processes enables us to meet the challenges of technological advance in every sector in which ESAB operates.

## Quality and environment standards

Quality, the environment and safety are three key areas of focus. ESAB is one of few international companies to have achieved the ISO 14001 and OHSAS 18001 standards in Environmental,

Health & Safety Management Systems across all our global manufacturing facilities.

At ESAB, quality is an ongoing process that is at the heart of all our production processes and facilities worldwide.

Multinational manufacturing, local representation and an international network of independent distributors brings the benefits of ESAB quality and unrivalled expertise in materials and processes within reach of all our customers, wherever they are located.

## ESAB Sales and Support Offices worldwide



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