



ESAB Marathon Pac™ total MIG/MAG efficiency

BULK WIRE SYSTEMS FOR NON AND LOW-ALLOYED
STEEL, STAINLESS STEEL, ALUMINIUM AND MAG BRAZING.



STRENGTH THROUGH COOPERATION

ESAB Marathon Pac™ - total MIG/MAG efficiency



AristoRod™ non-copper coated MAG wires with advanced surface characteristics (ASC) and Marathon Pac™ form the perfect combination for applications that require dependable long-term wire feeding over large distances coupled with superior arc characteristics at high welding currents. Ideal for mechanized and robotic welding.



OK Autrod Matt stainless steel wires is another example of ESAB's advanced wire products available in Marathon Pac™

Marathon Pac™ is ESAB's unique octagonal cardboard bulk drum system for MIG/MAG welding wires. It has often been imitated, but never equalled.

It is unique for its octagonal design. Foldable after use and fitting on a pallet, it saves dramatically on storage space compared with common round bulk drums. There are no metal handles or rings – all components are recyclable and can be disposed of with standard separated waste.

A second feature that makes Marathon Pac™ unique is the wide range of wire grades together with a complete family of drum sizes. The Marathon Pac™ programme covers steel, stainless steel, aluminium and copper-alloys, while a choice of drum sizes offers a solution for any kind of fabrication - from small workshops to large scale manufacturing, from manual to fully automated or robotised welding.

The third unique aspect is the complete range of accessories for efficient internal transport and handling and for astonishingly easy installation. No system in the world is easier to use and saves more costs on goods-in to work station logistics. These unique features set Marathon Pac™ aside from any other bulk packaging system, but there is much more to gain. Marathon Pac™ delivers savings right along the entire MIG/MAG production chain – from manual

through to robotic applications – irrespective of local labour costs.

Save on MIG/MAG downtime

With the standard Marathon Pac™ you cut spool change downtime by almost 95% when compared to the use of 18 kg spools, giving more 'arc time' with fewer workflow interruptions. This increases even further with the Jumbo Marathon Pac™ and – no downtime at all for spool change – with Endless Marathon Pac™.

Save on rejects and post-working

Unfinished work pieces or rejects due to abrupt spool wire ends are largely avoided with Marathon Pac™. Moreover, each Marathon Pac™ is filled using a special reverse coiling technology to ensure the wire comes out straight. This results in greater process stability, less spatter, perfectly positioned welds and, therefore, less rejects and cleaning.

Marathon Pac™ benefits:

- efficient handling; increased welding productivity
- reduced downtime; increased welding productivity
- process stability; continuous welding
- weld quality; well positioned welds, less rejects
- less equipment wear; less maintenance downtime, lower wear part costs

Save on feeder wear

With no revolving spools and straighter wires there is less wear of the feed system. The savings on guiding tubes, feed rollers and liners should not be underestimated.

All these savings are discussed and quantified in calculations based on experiences of major European users on pages 4 and 5, leading to the conclusion that fabricators can effectively get the welding wire for free when using Marathon Pac™.

Marathon Pac™ - a complete family

ESAB Marathon Pac™ is the most advanced bulk wire packaging system available to fabricators. The complete Marathon Pac™ family consists of:

- Standard Marathon Pac™
- Jumbo Marathon Pac™
- Mini Marathon Pac™
- Endless Marathon Pac™

Mini Marathon Pac™ is the latest addition and the perfect answer for fabricators with moderate usage of stainless steel wires, who wish to minimize the capital tied-up in a standard sized drum, without losing the benefits of low downtime and high productivity.

Endless Marathon Pac™ is the latest step in MIG/ MAG efficiency – a system with many advantages for true lean manufacturing in just-in-time production and multi-robot stations.

The Marathon Pac™ family. From left to right: Endless Marathon Pac™, Mini Marathon Pac™, Standard Marathon Pac™ and Jumbo Marathon Pac™.



The Marathon Pac™ family – wire grades and filling content.

W x H	Standard Marathon Pac™ 513 x 830 mm	Jumbo Marathon Pac™ 595 x 935 mm	Mini Marathon Pac™ 513 x 500 mm	Micro Marathon Pac™ 595 x 510 mm	Endless Marathon Pac™ 2 x standard or jumbo
Non- and low-alloyed steel					
Solid wires	250 kg (Ø 0.8 mm: 200 kg)	475 kg (min Ø 1.0 mm)			2 x 250 kg 2 x 475 kg
Cored wires	Depending on type	Depending on type			
SAW wires		Ø 1.6 mm: 475 kg Ø 2.0 mm: 450 kg			
Stainless steel					
Solid wires	250 kg (Ø 0.8 mm: 200 kg)	475 kg (min Ø 1.0 mm)	100 kg		2 x 250 kg 2 x 475 kg
Cored wires	Depending on type	Depending on type			
SAW wires		Ø 1.6 mm: 475 kg Ø 2.0 mm: 450 kg			
Aluminium			(559x508 mm)		
Solid wires		141 kg	80 kg	25 kg	
Copper-based					
MIG -brazing wires	200 kg				

Endless Marathon Pac™ - now there is no end to robot productivity



The wire from a second Marathon Pac™ is joined to the first using a special portable butt welding device.



The pear is an ESAB invention that facilitates a smooth transition when the wire crosses over from one drum to the other. The wire passes through the pear which is placed on top of the first drum when it is installed. When the drum is empty, the pear crosses over while the wire conduit swings to the new drum.



Endless Marathon Pac™ does exactly what it says, providing total efficiency with no stops for changeover at all. Well before the Marathon Pac™ finishes, the wire from a second Marathon Pac™ is joined to the first using a special portable butt welding device. This procedure takes less than a minute. The clever changeover mechanism then automatically transfers the feed from the first to the second drum while the robot continues to weld faultlessly.

In highly automated, just-in-time production, even one stop per drum is regarded as being too much. For those fabricators, ESAB's new Endless Marathon Pac™ provides the final step

towards total efficiency – no stops at all for wire change. By repeating the wire joining procedure, uninterrupted supply of wire is achieved. Welding systems no longer have to stop for wire exchange– only for planned maintenance.

For multiple robot stations, Endless Marathon Pac™ benefits are even greater. No longer is it necessary to halt an entire production cell, just because one of the robots needs a new drum.

A continuous supply of wire also ensures against components only being partwelded because spools or drums have emptied during the welding sequence.

Marathon Pac™ - the savings quantified

Table 1: Typical cost savings for professional users - 18 kg spools vs Marathon Pac™

	Low labour cost environment	High labour cost environment	Highly mechanised environment
Operating cost EUR/hr	10	50	250
Cost savings - EUR/kg wire used			
Reason			
Downtime	0.13	0.64	3.22
Weld quality	0.20	1.00	2.00
Equipment wear parts	0.05	0.10	0.20
Total EUR/kg wire	0.38	1.74	5.42
Total EUR for 250 kg	95	435	1355
Total EUR for 475 kg	181	827	2575

ESAB Marathon Pac™ is designed to enable customers to get the maximum return on capital for their automated solutions.

Typical cost savings for professional users

Table 1 gives an overview of typical cost savings when comparing Marathon Pac™ with 18kg wire spools. These are based on actual tests and reports from various industries – in both low labour cost and high labour cost environments, and in a fully mechanised production environment.

Operating costs

It is essential that full welding station operating costs are considered, not just the net hourly wages of the welder. These include:

- All indirect costs such as social charges, pension, sickness payments, holiday and overtime allowances, productivity and performance bonuses.
- Depreciation costs with highly mechanised installations.
- Premises and auxiliary equipment such as overhead cranes and forklift trucks.

- Operator revenues to cover overhead costs such as supervisors, forklift drivers, QC inspectors, management, HR, administration and sales.

Being conservative, ESAB estimates the operating costs for a low labour cost environment to be 10 Euro/h. In a high labour cost environment, various Western European customers use a rate of 50 Euro/h. For highly mechanised manufacturing, 250 Euro/h is typical for a welding station with a couple of robots and manipulators. Some just-in-time suppliers in the automotive industry calculate with 2,000 Euro/h.

Downtime costs

Welding station downtime for spool change depends on factors such as the set-up (accessibility of the wire feeder, liner length, etc), management focus on lean manufacturing, and whether operators are paid by finished piece. It is also influenced by the distance to the location where spools are stored. Table 2 calculates typical savings on down-time for changing

Table 2: Downtime cost savings - 18kg spools vs. 250 kg Marathon Pac™.

Spool Weight	18 kg	250 kg MP
Spool changes/ton of wire	55.6	4.0
Spool change time (min)	15	15
Total time per ton(hr)	13.9	1.0
Downtime saving (hr/ton of wire)	-	12.9





18kg spools versus 250 kg Marathon Pac™s. The savings on downtime in Euro/kg wire for the three operating levels are shown in the 3rd row of table 1 and an estimated 15 min. change for both spool or Marathon Pac™.

Weld quality

Stable feeding and straight wire delivery from Marathon Pac™ leads to joints that are well positioned, with a good penetration and appearance, less spatter and less post weld repair. Quantifiable results are available from a well known European mass production automotive components company. Savings due to the reduction of welding defects, re-work, grinding, scrapped materials, etc, amounted to five times the cost savings on downtime only for the 50 Euro/h operating cost group, in table 1. This means that their recorded benefits exceed 2 Euro/kg wire, - purely due to improved weld quality. In table 1, we stay conservative with 1 Euro/kg for the high cost environment, a level confirmed by other studies in this field and 2 Euro/kg for the highly mechanised environment. For the low cost environment we have reduced the quality savings to only 20% of the high cost group, mainly because re-work costs are lower.

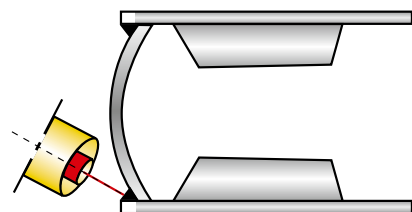
parts costs for industrial users. Typical consumption is around 2 tons of wire/year per welding machine. Typical wear parts cost 200-400 Euro per year/welding machine (labour costs excluded).

In table 1 we have again been conservative, taking 200 Euro per year as a representative figure for spare parts. For the low cost environment the assumption is that spare and wear parts costs per kg of wire is never less than 50% of the above, ie, 0.05 Euro/ kg wire. For the high labour cost environment, the saving amounts to 0.10 Euro per kg wire.

In the highly mechanised environment, as downtime is so costly, manufacturers should allow a higher safety margin in terms of preventive maintenance. It is realistic to double the cost in comparison with the high labour cost environment.

Marathon Pac™ pays back.

Changing to Marathon Pac™ always gives pay back, regardless of the cost environment. The total savings in the low operating cost column of table 1 are not necessarily "typical", but minimum. From the higher cost columns, anyone buying MAG wire will understand that under "typical" conditions, savings will be at least the same, or exceed, the cost price of the wire. Marathon Pac™ is, therefore, more cost-effective than spools in any environment – and could effectively be free of charge!



Straight wire delivery results in well-positioned welds and fewer rejects.



Equipment wear parts

The absence of a turning weight, as with 18kg spools, leads to reduced wear in the feed system, eg, liners, and feed rolls. ESAB has studied the wear and spare

Designed for fast, efficient handling



Marathon Pac™s can be hand-pushed to the welding station when lifted onto the special trolley.

Marathon Pac™ is designed for fast, efficient handling. Delivered on pallets containing four standard Marathon Pac™s, or two Jumbo Marathon Pac™s, the protective foil around each pallet is quickly removed. Compare that with traditional 18 kg spools which first have to be individually unwrapped, box by box.

Marathon Pac™ is easily transported using a lift truck or a standard overhead gantry and the certified yoke that fits easily into built-in lifting straps which are also certified. Additionally, there is a special trolley accessory to allow final positioning close to each welding station.



Marathon Pac™s are easily lifted to the welding station using the special yoke.



Marathon Pac™s come four (Standard Marathon Pac™) or two (Jumbo Marathon Pac™) on a pallet wrapped in protective foil.

Installation couldn't be easier



Step 1. Remove the rubber strap and VCI paper.



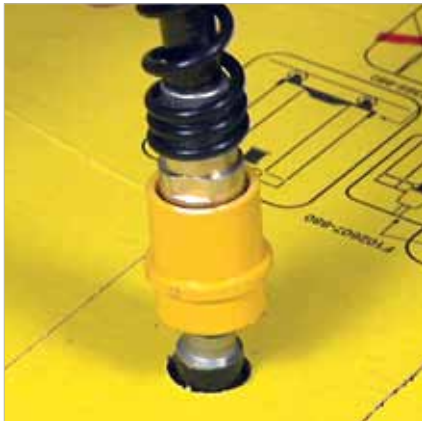
Step 2. Place the wire conduit attachment or "spider" on top of the Marathon Pac™.



Step 3. Feed the welding wire through the centre of the spider.



Step 4. Place the carton or plastic lid (Standard and Mini Marathon Pac™) or cone (Jumbo Marathon Pac™).



Step 5. Attach the wire conduit to the lid or cone with the quick connector.



Step 6. Attach the wire conduit to the wire feeder.



Special cone for Jumbo Marathon Pac™ with 475kg non- or low-alloyed wire or 141kg aluminium wire (special connector and conduit required).

Easy and environmentally-friendly disposal



Marathon Pac™ is easily dismantled and folded flat for space saving storage.













The difference in space between 18 unfolded and 18 folded Marathon Pac™s. Solid round drums would occupy all this space in a workshop.

Due to its unique octagonal design, Marathon Pac™s are foldable after use to fit on a pallet, which saves dramatically on storage space compared with common round bulk drums. There are no metal handles or rings – all components are recyclable and can be disposed of with standard separated waste.







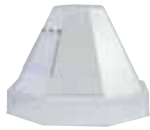



Once empty, simply remove the lifting straps and bottom from the octagonal drum and fold it completely flat for easy and space saving storage until collection. Because each drum is made from 100% high quality, double-skinned recyclable cardboard, many users gain a return fee from their paper recycler.

A full range of accessories

Product	used for	length	code	
Wire conduit attachment	Standard and Mini Marathon Pac™		F102 433-880	
Wire conduit connector to feed unit	Standard, Mini and Jumbo Marathon Pac™		F102 440-880	
Quick connector plastic hood	Jumbo Marathon Pac™		F102 442-880	
Lifting yoke	Standard and Mini Marathon Pac™		F102 607-880	
	Jumbo Marathon Pac™		F102 537-880	
Trolley	Standard and Mini Marathon Pac™	Without pos. 5	F102 365-880	
	Jumbo Marathon Pac™		F103 900-880	
Wire conduit	Standard, Mini and Jumbo Marathon Pac™	0.645 m	F102437-886	
		1.8 m	F102437-881	
		3.0 m	F102437-882	
		3.8 m	F102437-889	
		4.5 m	F102437-883	
		5.3 m	F102437-888	
		6.0 m	F102437-887	
		6.5 m	F102437-890	
		8.0 m	F102437-884	
12.0 m	F102437-885			
Plastic hood flat	Standard and Mini Marathon Pac™		F102 540-001	
Plastic hood cone	Jumbo Marathon Pac™		F103 901-001	
Plastic hood	Endless Marathon Pac™		F102 581-001	
Plastic hood	Endless Marathon Pac™		F102 678-001	
Plastic pear	Endless Marathon Pac™		F102 679-003	
Complete stand	Endless Marathon Pac™		F103 899-880	
Butt welder	Endless Marathon Pac™		F106 660-883	

Aluminium accessories

Aluminium Marathon Pac™ standard accessories

Product	used for	length	code	
Lifting yoke	Jumbo Marathon Pac™		F102 537-880	
Trolley	Jumbo Marathon Pac™		F103 900-880	
Pak connector plastic hood	Jumbo Marathon Pac™		9901000003	
Wire conduit connector to feed unit (ESAB) Contact ESAB for other feeding units				
Pak-feed-assist for 4XXX wires	4-series, e.g. 4043, 4047		9901000012	
Wire conduit		5m length 10m length 30m length	9901000005 9901000010 9901000030	
Plastic hood cone	Jumbo Marathon Pac™		F103 901-001	
Pak-ring for 5XXX wires	5-series, e.g. 5356, 5183		9901000002	
Optional accessories				
Pak-track for 5XXX wires 5-series, e.g. 5356, 5183, in special applications.			9901000007	
Wire straightener 5-series, e.g. 5356, 5183, in special applications			9901000006	

For alloy specific and welding machine specific set-up instructions please contact your local ESAB sales office or representative.

World leader in welding and cutting technology systems.



HIAB AB, in Hudiksvall, Sweden, manufacturer of truck-mounted loader cranes - carried through a project to robotise the majority of their welding operations within a period of three years. ESAB joined, in as a strategic partner. Robots were equipped with ESAB cored wires in Marathon Pac™ for optimal productivity.

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 advances 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.

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