Welding solutions **for pipemills**

GLOBAL SOLUTIONS FOR LOCAL CUSTOMERS – **EVERYWHERE**

World leader with 100 years of experience

ESAB was founded back in 1904. Since then, we have been pioneers in the fields of welding and cutting for industries of all kinds – all over the world. Unlike many other players on the market, we design, develop and manufacture all our products ourselves. This control enables us to make adaptations to match each individual customer's situation and needs, thereby contributing to the highest quality and best possible production economy. So, the only question is: what is your challenge?

The customer's challenge is not the only focal point at ESAB. We also challenge ourselves to be the best in different respects. For instance, we always strive to adopt a life-cycle approach in everything we do to minimise the environmental impact of our products and services. Every ESAB production unit has ISO certification, which proves that we give top priority to quality issues. In addition to ISO, we have obtained certification from a number of other bodies including ASME, KTA and TüV.

Content

Our experience and knowledge – your benefit

We are a complete, reliable partner for pipemill welding. Not only do we have in-depth experience of demanding multiwire submerged arc welding. We also have a comprehensive range of products for this type of production.

For more than 60 years, we have been the preferred partner for industries all over the world when it comes to equipment for advanced submerged arc welding in thick materials. Comprehensive solutions for welding ships, pressure vessels, trailer beams, earth-moving equipment, cranes… the list is long.

We have also been a reliable supplier for pipemills for many years. We have delivered robust DC and AC power sources, extended welding heads using additional wires, replaced wire-feed systems with our strong feed system and incorporated process controllers and documentation systems with connections to local networks and quality assurance systems.

Due to increasingly rigorous demands in the pipemill industry and our customers' desire to reduce the number of suppliers, we have extended our product portfolio.

Today, our products include tack welding systems and internal and external welding heads, as well as internal booms, advanced return current systems and reliable flux-feed equipment. This is complemented by the most modern process controllers and documentation systems.

Our overall aim is to live up to our promise to supply sophisticated, customised welding solutions that boost both quality and productivity.

Front of an internal SAW head with a flux suction nozzle.

Longitudinal internal welding station at work.

Precise, high-speed longitudinal welding

Our concept for longitudinal submerged arc welding is suitable for pipes in a normal diameter range of 20” – 64”, a normal wall thickness of 6 to 40 mm and a length of up to 18 m.

Our offer for longitudinal welding comprises a number of features to facilitate and streamline production. In addition to this, every customer’s WPS (Welding Procedure Specification) is tested and analysed at ESAB’s Process Centre in Göteborg, Sweden.

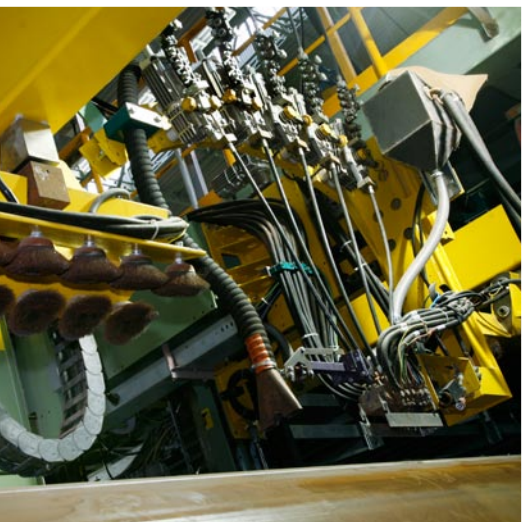
After the continuous tack welding station, the steel pipe undergoes internal welding, followed by external welding – at the highest speed it is possible to achieve today.

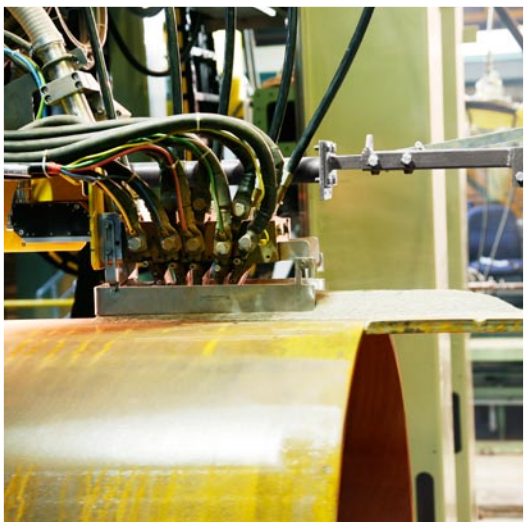
For internal welding, we have developed welding heads for up to four wires. When it comes to external welding, we can offer welding heads for up to five wires.

During internal welding, a front-mounted laser sensor guides the welding head via the cross-slide. The process is supervised on an external monitor via a video camera.

For both welding procedures, ESAB has developed a movable return current system, based on two rows of robust steel brushes, pressed against the outside surface of the pipe to stabilise the current flow.

Longitudinal external welding station at work, with a check of starting position.





ESAB power sources in the Pipemill Edition on a service platform and a highly advanced control cabinet.

Flexible, reliable welding equipment

We have a wide range of products developed in house for various multi-wire SAW applications which are particularly suitable for pipe welding. The range includes AC-DC power sources in the Pipemill Edition, controls for multiwire processes including documentation, as well as columns and booms with a variety of welding heads.

From the design angle, the internal welding station is the most interesting. The first feature is the carrier, an internal boom with a length that enables it to carry welding heads of up to 18 m for longitudinal welding and up to 24 m for spiral welding.

ESAB has designed pre-stressed booms, which are absolutely straight and stable when loaded. Swinging at the front is avoided by either four steel brushes which move to the side of the inner pipe near the welding head or by a bogie with rolls.

With an outside pipe diameter of 20”, there is not much room to play around with a four-wire welding head, cross-slides to position the welding head exactly on the bead preparation, the laser guiding system, the video camera, including light, flux supply hose and intermediate storage, not to mention flux suction and all the welding and control cables.

Using powerful DC motors, ESAB can easily fit the wire-feed units, including a double straightening system at the end of the boom, which offers several advantages when it comes to wire changing, service and temperature load on the motors.

The boom is fixed to the floor by a rigid steel frame, which is bolted to the floor. The rear end has a pivot point which can be moved a certain distance up and down to adjust the height of the welding head to match the different diameters of the pipes.

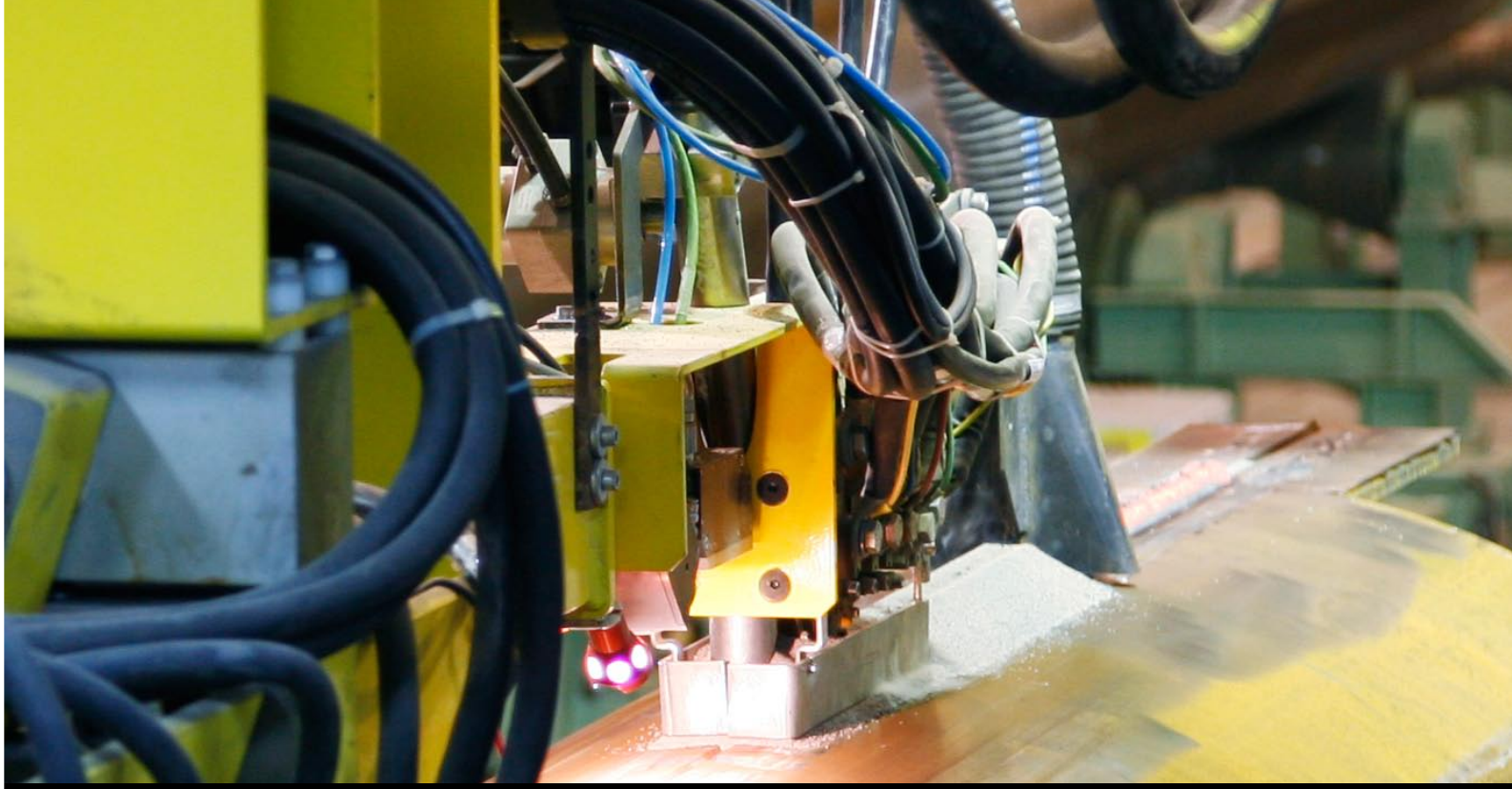
If necessary, the hydraulic tilting of the boom can be added as a feature to further secure the pipe in-feed procedure, if fixed transport systems are used, for example.

The ESAB power sources in the Pipemill Edition consist of modified, really robust and durable LAF 1600 DC and TAF 1250 AC versions. The modification mainly relates to the software, to adjust the dynamic reaction to the magnetic surroundings of the pipes. All the power sources can be set and monitored from the PLC controller.

Overview of five internal 18 m booms, each equipped with a four-wire SAW head.

Internal welding an

A controller supervising the process during internal reverse welding.



Start of external welding with a flux boat. Flux suction nozzle behind the process and first return current system in use.

nd external welding

End of external SAW. Camera supervision and second return current system in use.

Advanced welding heads for high productivity

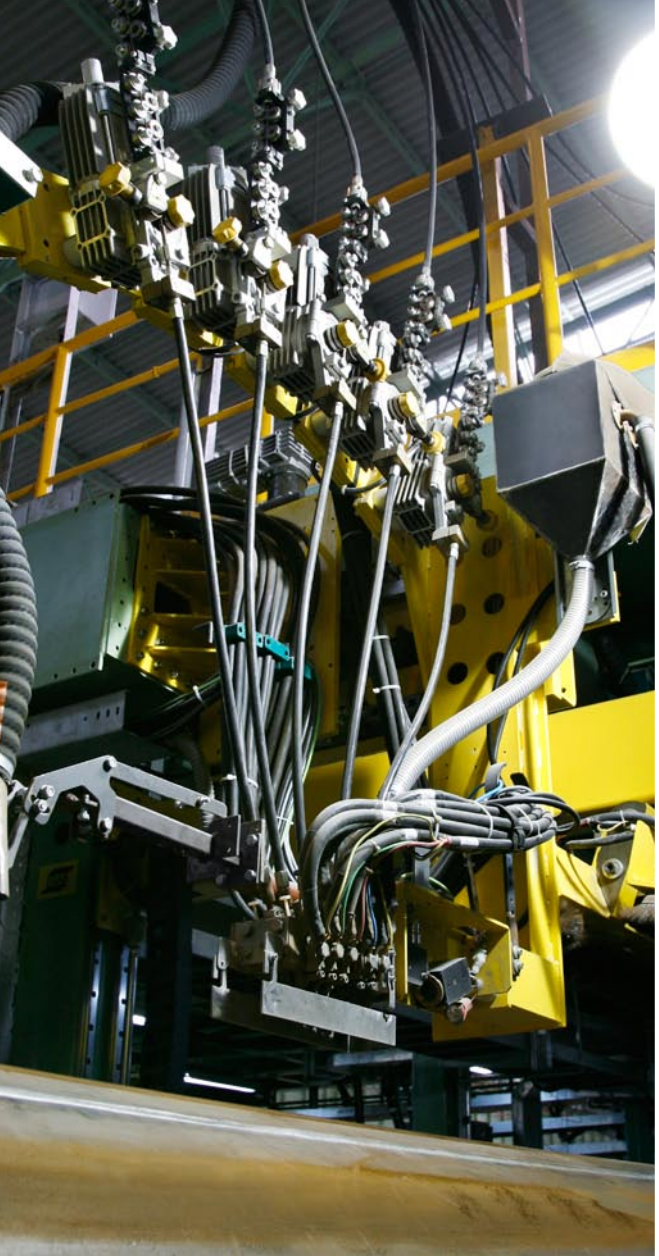
The external welding station is based on a column and boom solution with a very stable cross-slide to adapt to different pipe diameters. The actual welding head, with its five-wire feed systems mounted on a so-called “rainbow fixture”, is based on the ESAB A6S-Arc Master System which has been tested 10,000 times.

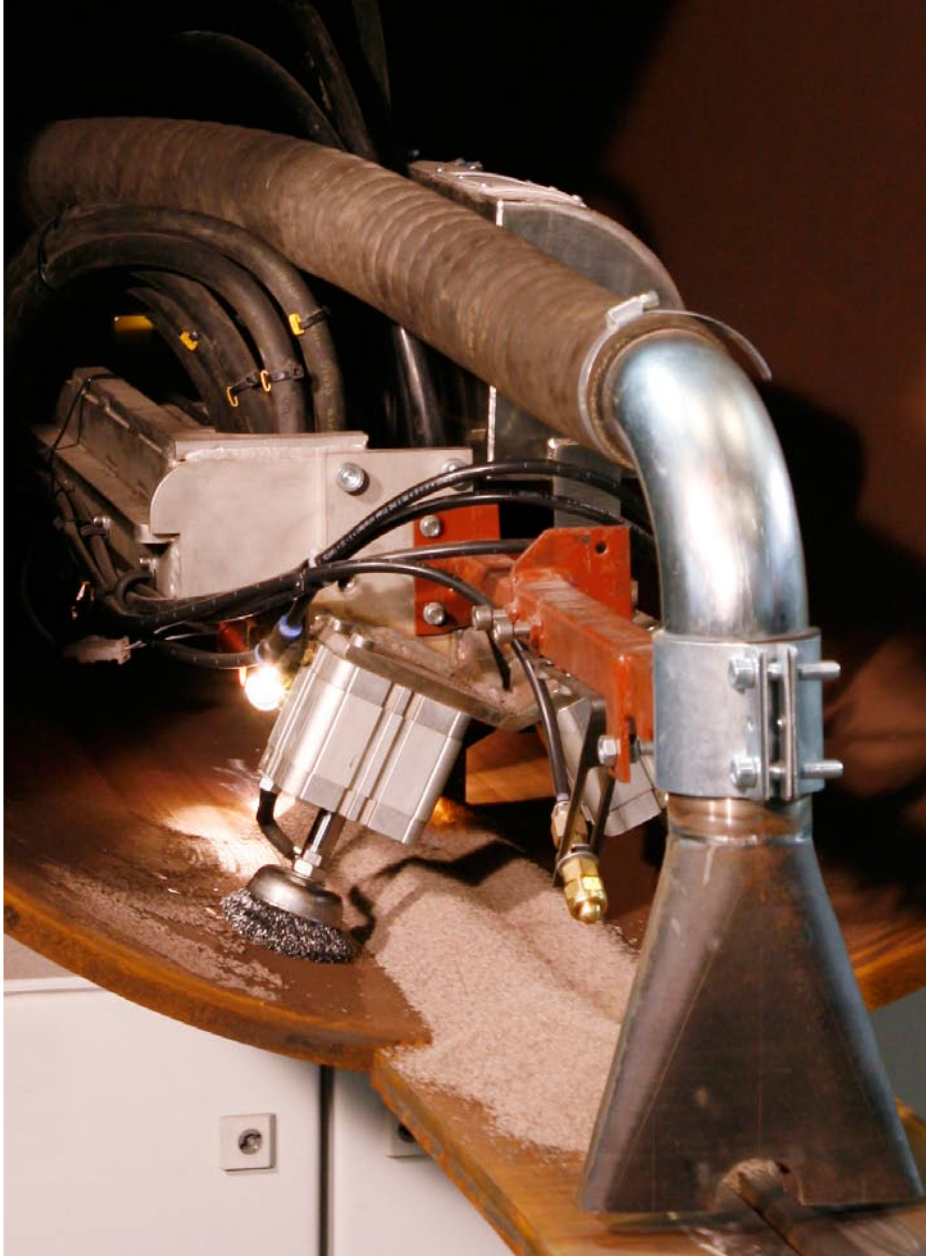
A laser sensor guides the welding head. If a sideways mismatch of the pipe occurs, a signal is sent from the laser sensor to the cross-slide to move the welding head to the right position on top of the weld. Every movement can be seen on an external monitor via a video camera.

A defined flux boat secures the correct amount of fresh flux for the welding process. The wires are smoothly guided via wire lines into the contact equipment of the welding head. The contact equipment comprises spring-loaded contact jaws and fixed spacers between the different wires.

The spacers can have variable or fixed angles, so that each wire has a defined position for a given welding procedure. This prevents the angle being changed by mistake or by impact from outside.

If a different wire set-up is needed for other pipe dimensions and thereby requires a new WPS (Welding Procedure Specification), the spacers can be replaced with an alternative set.

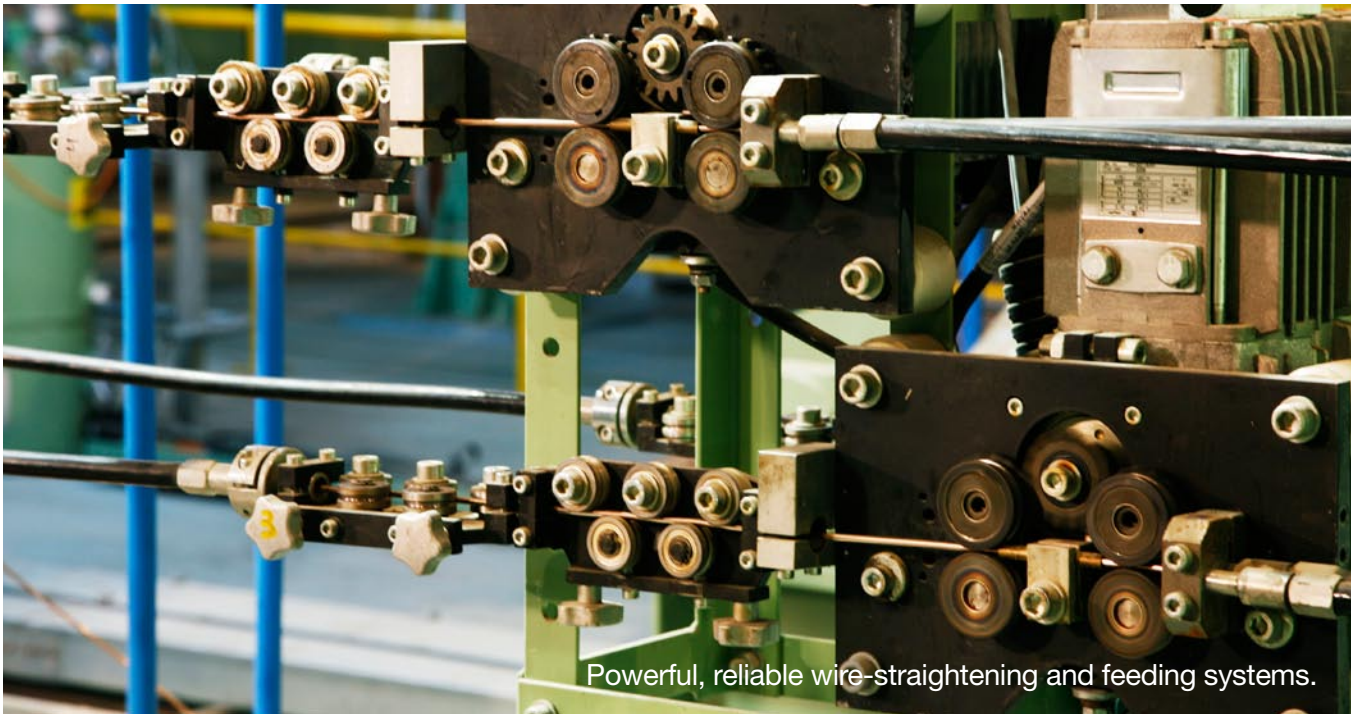




Internal and external welding heads during operations,

ESAB EcoCoils with 1,000 kg of wire on turntables.

Flux supply and power sources on a service platform.



Powerful, reliable wire-straightening and feeding systems.

Problem-free flux and wire-feed systems

We offer the smooth feeding of wire in different diameters and the equally straightforward supply of new and re-used flux.

In a pipemill, every production stoppage is a nightmare. It is therefore absolutely necessary that every production component works every time it is needed. The same thing applies to flux and wire-feed systems in a welding station. The design of ESAB's flux and wire-feed systems has been tested many times, making them totally reliable.

At internal stations, the distance to the welding head is naturally much longer than it is at an external station. ESAB pushes the wire via a four-wheel drive system and accurate hoses to the welding head. It goes without saying that the correct wire quality and the exact straightening of wires before they pass the drive unit are essential. Wires from EcoCoils are shaped into a large circle for optimised wire straightening.

1,000 kg of flux in a BigBag

Securing the rational handling of flux is a good investment in several respects. Our solutions in this area are designed as an efficient recirculation system over long distances for continuous submerged arc welding.

The correct combination of compressed air, flux feeding, easy replenishment of new flux via the BigBag system, a vacuum unit, a reliable magnetic separator and continuous recovery helps to create welding stations with less downtime, high-quality welds and, last but not least, a cleaner working environment.

Spiral pipe welding

Many end users require spiral-welded pipes for different purposes, such as water pipes. Normally, the wall thickness is limited to 25 mm, but the diameter range can be up to roughly 2.5 m.

The two-step production process is used most frequently. The steel from the coil is bent to form a pipe at the forming station and it is also tack welded there. The angle of the spiral is dependent on the coil width and desired diameter of the pipe. After the desired length, which could be up to 24 m, the prefabricated pipe is cut and brought to the welding station after intermediate stocking.

As in all our SAW solutions, an internal welding head mounted on a long boom and an outside head mounted on a column and boom are used for spiral welding. However, this is the only similarity.

First of all, internal and external welding are performed at one and the same station. Internal welding starts first and, after half a turn, external welding then begins – internally with two or in some cases three wires and externally with one to three wires in the welding process, depending on the diameter and wall thickness of the pipe.

The internal and external welding heads need to be arranged flexibly in relation to the pipe diameter, the angle of the spiral and the roundness of the pipe. Both heads are easy to arrange, even when production changes occur.

The control and documentation of both welding heads with the parameters for each wire and the control of the longitudinal and circumferential speed of the pipe on its carriage need to be secured to guarantee top quality at all times. The control and documentation of difficult processes and the necessary peripheral equipment are one of the specialities ESAB offers, in addition to welding equipment.

Spiral welding, cutting and visual inspection.

High quality consumables

ESAB has a wide range of fluxes and wires for all kinds of pipe welding.

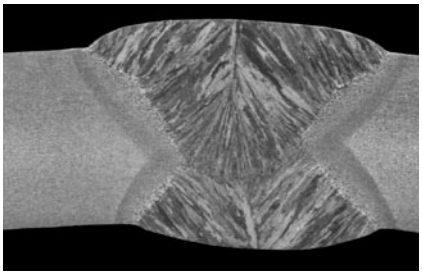
The complete range of fluxes covers everything from water pipes with relatively thin walls and usually no toughness requirements to thick, highly demanding gas pipes, including high strength steels X70, X80 and higher.

Fluxes for bulk end users are usually delivered in BigBags. The standard weight of a BigBag is 1,000 kg. All supply units can be filled with flux from BigBags. BigBags are made of woven propylene material, which has an internal moisture protection coating to keep the contents dry. The material is fully recyclable.

With more than 100 years of experience, ESAB can offer a wide variety of wires perfectly adapted for pipemill welding.

The problem-free decoiling of a spool containing a sufficient amount of wire is important for this kind of welding. For these applications, the ESAB EcoCoil is the right answer. The one-way packing material is reduced to a minimum, providing full protection during transport and use.

The advantage of the ESAB solution is that the wire is not spooled tightly around the cardboard core, thereby enabling the EcoCoil slowly to accelerate and slowly come to a halt while wire is fed at a constant speed to the welding head. This is especially important in the start and stop phase.



Cross section sample of a high quality weld.

ESAB fluxes for pipemills:

OK Flux 10.40	EN 760 - SF MS 1 88 AC	For pipemills with low requirements.
OK Flux 10.71	EN 760 - SA AB 1 67 AC H5	For spiral and longitudinal pipes with low and medium requirements.
OK Flux 10.73	EN 760 - SA AB 1 76 AC H5	For spiral and longitudinal pipes, especially for sour gas.
OK Flux 10.74	EN 760 - SA AB 1 67 AC H5	For longitudinal pipes with the most rigorous requirements, including sour gas service. and for all pipe materials.
OK Flux 10.77	EN 760 - SA AB 1 67 AC H5	For spiral pipes with the most rigorous requirements, for all pipe materials.
OK Flux 10.81	EN 760 - SA AR 1 97 AC	For spiral pipes with low and medium requirements.
OK Flux 10.88	EN 760 - SA AR 1 89 AC	For spiral pipes with low and medium requirements, especially for severe surface conditions such as rust and mill scale.

ESAB wires for pipemills:

OK Autrod 12.10	EN 756 – S1	SFA/AWS A5.17: EL12
OK Autrod 12.20	EN 756 – S2	SFA/AWS A5.17: EM12
OK Autrod 12.22	EN 756 – S2Si	SFA/AWS A5.17: EM12K
OK Autrod 12.24	EN 756 – S2Mo	SFA/AWS A5.23: EA2
OK Autrod 13.64	EN 756 - SZ (S3MoTiB)	SFA/AWS A5.23: EG

ESAB – your partner in pipemill welding

For any producer, quality and reliability are fundamental. To deliver the best products, always on target, a top-class partner is vital. When it comes to welding, no other company can offer a range of advanced equipment, consumables and know-how to rival ESAB.

As a supplier to the welding industry for more than 100 years and with more than 60 years' experience of submerged arc welding, ESAB can always offer a solution for any pipemill welding.

As we design, develop, manufacture and service all our products ourselves, along with continuous research and development to maintain our position as the welding authority, we can always offer unique, customer-specific solutions, together with a wide range of high-class standard equipment and consumables. Our top-of-the-line welding heads, perfect systems for feeding flux and wire and precise, high-speed equipment, in combination with a wholehearted customer commitment to ensure total satisfaction, make us the preferred partner in pipemill welding.

However, it takes more than excellent performance and quality welding results to remain the customers' preferred choice. Long-term solutions and life-cycle planning, including environmental considerations and health and safety issues, are a must. At ESAB, all these areas are in focus, along with our never-ending quest to improve customer productivity and performance.

As a global partner, ESAB can comply with any customer demand worldwide. When it comes to changes in production, quality control, the education of welding operators or any other issue – there are solutions and experience at ESAB. Our understanding of customers' situations has led to the development of optimised equipment and consumables.

For ESAB's customers, quality and reliability are standard

World leader in welding and cutting technology and systems

ESAB operates at the cutting edge of welding and cutting technology. More than one hundred years of continuous improvement in products and processes enable us to meet the challenges posed by technological advances in every sector in which ESAB operates.

Quality and environmental standards

Quality and the environment are two key focal areas. ESAB is one of only a few international companies to have achieved the new ISO 14001 standard in Environmental Management Systems at all its global manufacturing facilities.

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

Multinational manufacture, local representation and an international network of independent distributors bring the benefits of ESAB quality and unrivalled expertise in materials and processes within the reach of all our customers, no matter where they are located.

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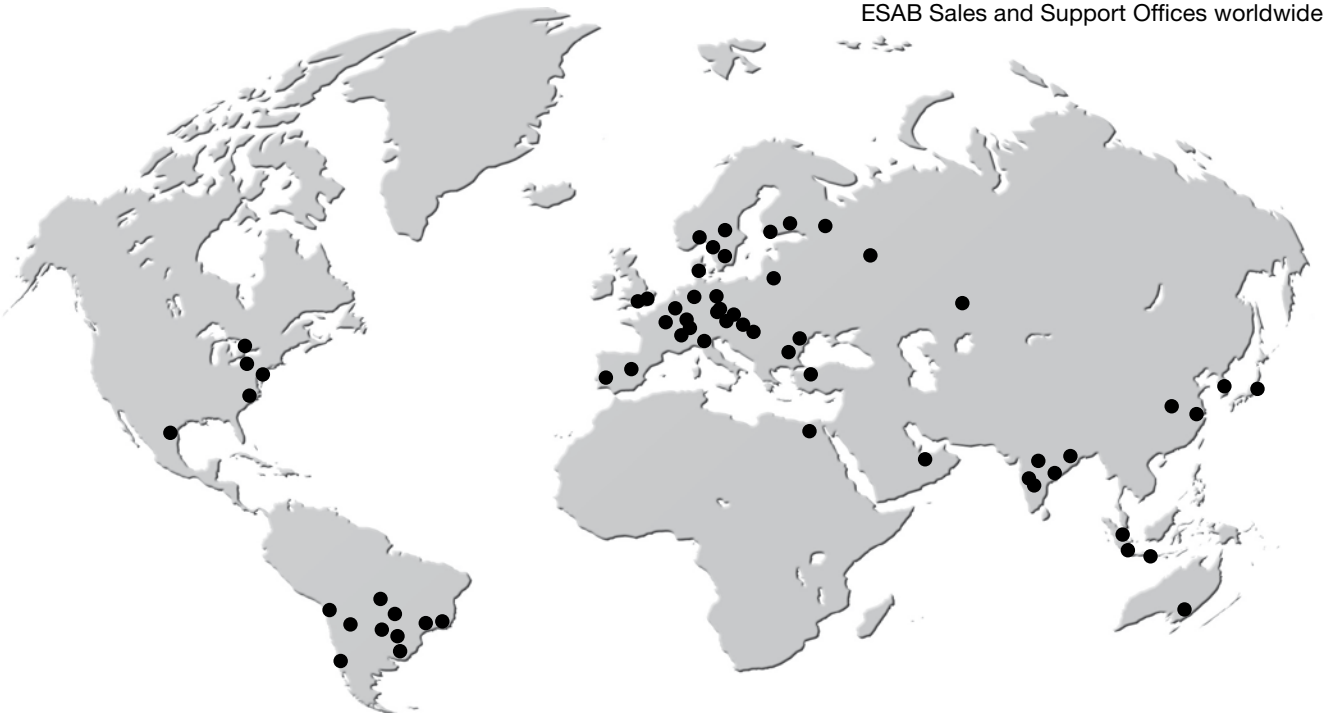
ESAB Sales and Support Offices worldwide



* Includes manufacturing facilities of ESAB North America.
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