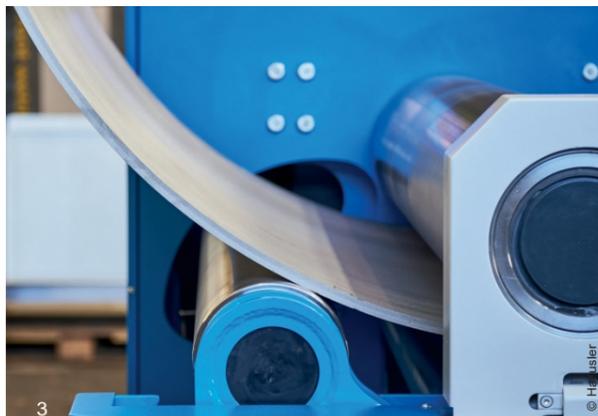


1 Due to the VAS-technology plates with high wall thicknesses can be bent.



# »IT IS FUN TO WORK WITH THIS MACHINE!«

**THIS UNANIMOUS VOTE** comes from the workers of the Apaco Company, one of the leading suppliers of apparatuses, equipment and components for the industry in Switzerland regarding the new EVO plate bending machines, the newest line of machines from Haeusler.



2 EVO 4-roll plate bending machine

3 The control system with the integrated Bendtronic collects experience in a program library, allowing even the first work piece to be of OK.

**W**e needed to replace old machines. Therefore we had a look at what our renowned neighbour had available« summarises Timo Wölker, welding expert EWS/IWS

and chief of quality assurance at Apaco. And it was the right decision since almost every new customer order is produced on the new machine. The machine had to be tested as Apaco was the lead customer for the new technology. The machine is now in operation for 18 months without the slightest problem and is producing parts of the highest quality as Wölker confirms. Lengthy maintenance is not required. Should the need arise remote maintenance over the internet is possible.

The new machine offers two unique features:

A control system with sophisticated AI and the variable geometry for the side rolls, that offers up to 85% additional bending momentum. This is achieved through a change of anchor point for the side rolls.

### Bending 2.0

In spring 2017 Haeusler started with the development of the new machine line that should change the bending process. The aim was that also users with only limited experience in plate bending should be able to achieve perfect bending

results and so halve the machine cost. In autumn 2018 the EVO was ready for production.

Before the EVO with the retirement of the bending expert, the company also lost his experience and knowledge. The EVO changes this, as long experience in bending is no longer needed. The AI in the Bendtronic is collecting the experience for the company. The AI has machine learning and is correcting for deviations in the material yield on the basis of the measured bending effect. This data is fed back to the AI that then adapts following bending passes on the basis of this data.

»The big advantage: even without basic knowledge in plate bending a user, with the support of the AI, can bend a good product in 90% chance.«, assures Arben Djokaj, Senior Sales Manager at Haeusler. This means that users with only a basic training and support of the AI can offer the company a productivity of an experienced worker – in regard of the current shortage of qualified personnel a possibly very important advantage.

»Once the principle is understood, the programming over the touch-screen user interface is very simple und intuitive«, confirms Timo Wölker. Only 10 to 15 min are needed to make a new program or modify an existing one. This allows the company to better calculate delivery deadlines.

This way, knowledge regarding the different products and materials accumulates in the library of the control system. The programs stored there

can be recalled and modified if necessary with minimal effort.

### Bending becomes child's play

With this new technology bending difficult shell parts and components as serial parts becomes possible from the first plate. The software has graphic support and also allows for bending in several passes. The EVO can form every kind of product like simple cylinders, ovals, containers or other complex geometries, even S-shapes. These complex multi radii geometries like ovals, pillows or beakers are usually real challenges for machine operators. With graphics support the final geometry is defined and the AI is then calculating the machine settings and all process steps from the flat plate to the finished product. The operator can start production immediately after the simulation is finished.

The smart control system also ensures that in the production of single parts or series with limited production numbers no drop in quality occurs. »The final geometry is approached in steps, the first bending pass should be setup to be a little bit bigger than the final geometry. For the second pass the real achieved values have to be fed back to the machine and the final geometry will be reached in the second bending pass.« summarizes Timo Wölker.





1 With the patented VAS-technology up to 85% more bending power can be achieved

2 Arben Djokaj (Haeusler, l.), a bending expert at Apaco, Timo Wölker (quality assurance at Apaco, r.)



2

The control system simulates the material properties, machine behaviour and the plate-machine interactions.

With this the AI calculates the bending settings to reach the desired product with given material properties. The simulation takes into account the nonlinear creeping of the materials and therefore knows in advance how much material springback is to be expected for each plate thickness. The machine behaviour is calculated on the basis of the properties of the rolls, machine stiffness and friction. The simulation of the machine-plate interaction contains contact points and gravitational forces interacting with the plate. With the »internal« calculations the user always knows what can be bent and how, even without much prior experience.

The CNC plate bending software also offers support for finalising already partially formed work pieces, allowing for easy and efficient rolling of complex multi radii shapes, giving excellent quality results from the first plate.

#### Maximising application range

A further intelligent feature of the EVO is the new and patented VSA-technology. This feature can increase the bending momentum strongly, allowing the user to bend thick but also thin plates

»The new EVO line should turn into a real cash cow.«

Timo Wölker, Apaco

at the optimal geometry. This is achieved by two possible bending geometries that can be selected according to the need. This increases the bending momentum up to 85% compared to plate bending machines without this feature, allowing the bending of much thicker plates. Additional thin interchangeable top roll can be used to bend small diameters.

By using to different turning points for the adjustment of the side rolls the machine can be adjusted to the actual need. A wide bending geometry helps with thick plates; a narrow bending geometry is optimal for bending small diameters.

»The machine is designed in a way that all needed adjustments can be doing very fast and without any special tools. Not only the switch between turning points for the side rolls is very fast and easy. Also a top roll change can be thanks to the new design be made in less than 30 min.«, confirms Arben Djokaj.

The developed hybrid drive system HHDS offers a high efficiency through the use of a combination of electric motors with planetary gears. This saves up to 50% of the running costs for the machine. Additionally this system allows a stepless adjustable rotation speed of 0-8 meter per minute, an increase of 60% compared to other such machines on the market. The higher rotation speed is especially useful during the bending or calibration of large diameters.

#### Standard but flexible

A further advantage of the EVO is the price. Haeusler can offer the EVO at a very reasonable price since it is a standard machine. »You can add and integrate standardised modules that are on stock and can be delivered on short notice. This ensures minimal delivery times to fulfil our customer wishes without becoming expensive.« assures Arben Djokaj.

But also customer specific non standardized solutions are possible. Apaco for example wanted to have a support for the bent plate that was fitted with a joint to make space for the crane.

Regarding the low investment cost together with the low running costs and the high productivity, the new EVO is a real cash cow confirms Timo Wölker. The new EVO machine at Apaco produces always on the best quality level, optimizes itself and therefore stays on the technological edge - a real investment into the future.

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