

## 5 axis programming system

### EMO Debut at hall 4, stand D76

#### Extremely fast machining of large workpieces

*With the new ES-Mill 5 axis programming system the German company awtne GmbH offers software, which enables extremely fast machining of large curved parts.*

**Enhanced Surface Milling** is a new 5-axis milling process with which convex or concave parts can be machined considerably faster and more effectively than conventional line milling done with a ball milling tool.

The tool works using an angle adjustment, directed towards the part surface so that the line of contact corresponds to an ellipse section. The cutter angle and thereby the radius of the line of contact are calculated in such a way that the widest possible line is created. ES-Mill achieves a maximum ratio of line width to tool diameter of 1:2; that means in an optimal case a tool with for instance 100mm diameter can achieve a milling width of 50mm.

Compared with a fixed set toric milling tool with a maximum line width of 2,5mm the milling line with Es-Mill is 20 times wider. Using a ball milling tool with a maximum line width of 0,5mm the ratio is even greater at 1:100.

The fact that with **Enhanced Surface Milling** machine movements are reduced to approx. 20% of times achieved during 3-axis high speed milling can be disregarded, because altogether an operator saves 80-90% of machining time when using ES-Mill for machinable surface areas.

Other advantages are the considerably lower RPMs and feed required than when using ball milling tools (no high speed spindles required), as well as such a reduction in machining times that manless shifts and unattended machine operation are only necessary in exceptional cases.

ES-Mill is not to be compared with the so-called ISO-spot facing. The toric tool is in fact also guided across the part in 5-axis simultaneously in a constant relative angle to surface normal, but contrary to the normal 3-axis ball milling, it produces only one flat, wide milling line.

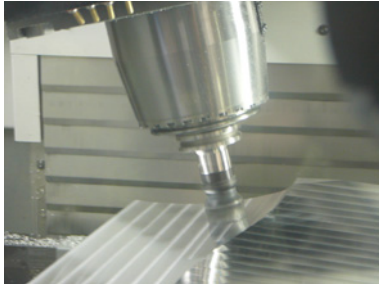
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## PressInfo

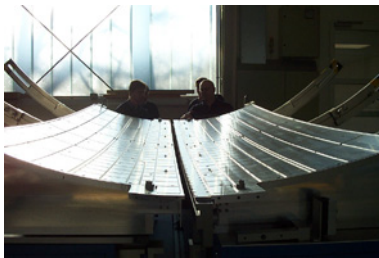
That means that material remaining on the right and left of the tool centre has to be removed (smoothed) in follow-on steps.

Using ES-Mill however results in a finished, smooth surface (max. 50% of tool diameter) within the specified tolerance.



*Es-Mill1.jpg*

Ideal for milling large, curved surfaces: Enhanced Milling Software is a new 5axis milling process, which achieves a maximum ratio of milling line width to tool diameter of 1:2.



*Es-Mill2.jpg*



*Es-Mill2a.jpg*

A practical example: A concave surface for a vacuum chuck in tensile aluminium (3200x800x400 mm) was machined on a milling machine with an HM cutter head Dia 160mm, cutting data RPMs S2500, F2000 in just 20 minutes (main time for one sequence, without follow up processes like milling slots, drilling etc.). Cutting width was 80mm.