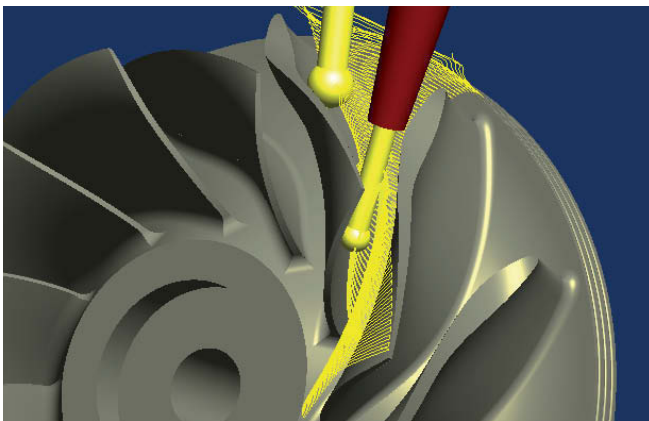
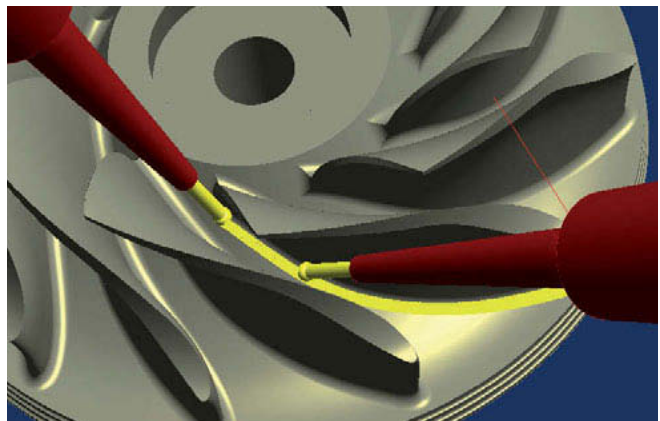


## Francis turbine: Milled on an ALZMETALL GS 650/5-T

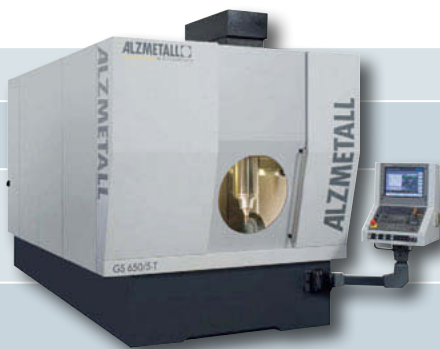
The long and tightly twisted blades of the Francis turbine limit the accessibility of tools. Therefore, machining cannot start from the shroud and proceed in the direction of the floor; instead, the starting point for calculations must be the blade edges in the pocket between two blades. In contrast to conventional machining processes, this allows shorter tools to be used in certain circumstances and therefore yields more effective process parameters. The extension of the *hyperMILL*® Multiblade package to include these machining strategies allows tightly twisted blades and even shrouded impellers and blisks to be programmed very easily.



**Blade machining:** The machining of pockets between blades can be divided into several depth ranges with different tool diameters and lengths in order to mill effectively using the most stable tools.



**5-axis rest machining:** The standard *hyperMILL*® strategies are also available for machining. The transition radii, for example, were milled on the floor of the pocket using the 5-axis rest machining strategy.



### Machine: ALZMETALL GS 650/5-T

Main drive (spindle)	RPM range	30.000 m <sup>-1</sup>
Workspace	Rapid movement/feedrate	60 m/min
	Traverse path X/Y/Z	650/650/550 mm
NC swivelling rotary table	Clamping surface	Ø 450 mm
	Tilt Range (A)	±120°
	Turning / Rotary Axis Range (C)	360°
	Max. workpiece weight	500 kg
Tool	Tool magazine	33 spaces
	Max. tool length:	350 mm
	Max. tool diameter:	95 mm
	Tool adapter	HSK-A63
Automation	Controller	Heidenhain iTNC 530
Workpiece	Dimensions (Ø x height)	Ø 200 mm x 100 mm
	Material	Bronze



OPEN MIND Technologies AG  
 Argelsrieder Feld 5 • 82234 Wessling • Germany  
 Phone: +49 8153 933-500 • Fax: +49 8153 933-501  
 E-mail: Info.Europe@openmind-tech.com  
 Internet: www.openmind-tech.com



ALZMETALL Werkzeugmaschinenfabrik und  
 Giesserei Friedrich GmbH & Co. KG • Germany  
 Harald Friedrich-Str. 2-8 • 83352 Altenmarkt/Alz  
 Phone: +49 8621 88-0 • Fax: +49 8621 88-213  
 E-mail: info@alzmetall.de  
 Internet: www.alzmetall.de