

SwissCeraMill™ Ceramic Mill Cutter – Revolution in Aluminium Milling

In a record time of just six months, the partners A&L Tool AG/CH and BSQ TECH GmbH/CH have launched the SwissCeraMill™ on the market, an innovative and revolutionary milling cutter tool based on zirconium oxide, which maximises service lifetimes for use with aluminium, non-ferrous metals and diverse composite plastics. Service lifetimes have been tested as being at least 10× the norm. The EU and Switzerland are very important to both companies as a base, and for this reason, everything is developed and produced 100 % in Switzerland. Switzerland is known for its high-level innovation in meeting the most difficult challenges in machining technology. The biggest advantages of this cutting technology are time and quality, thanks to higher feed rates, higher infeeds and better surface qualities. Detailed information is presented in the article.



Fig. 1
Jetmir Bejtulai, CEO of BSQ TECH GmbH (L.) with Vasfi Gjura, CEO of A&L Tool AG

Trailblazing technology in metal cutting

Mill cutting with ceramics is known to some extent in the world of milling and machining technology. We know alumina cutting inserts made of ceramic for turning cast ma-

Keywords

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terials. For machining Inconel 718, we are seeing machining tools made of silicon nitride or SiAlONs being used more and more. Both companies have chosen a special high-tech ceramic material that demonstrates optimum properties to specifically enable the cutting of aluminium.

Thanks to A&L Tool AG's experience in grinding mill cutters and the support of BSQ

Tech GmbH, an expert in technical ceramics, A&L Tool AG has come up with an invention to proverbially revolutionise the grinding process for the SwissCeraMill ceramic mill cutters. New grinding disk concepts and methods have been developed, to realise a very gentle and economical grinding process for technical ceramics. A&L Tool AG is well-known in Switzerland and a long-standing expert in making carbide tools for CNC mill cutting, and in Switzerland it has now become an expert in machining high-tech ceramic materials.

Exceptionally high efficiency

This new cutting tool performs longer than all existing carbide cutting tools in the cutting of aluminium and other non-ferrous metals. From several tests with customers, it has been shown that service lifetimes

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with this cutter for the machining of aluminium are at least 10x longer. Thanks to the long service lifetime, process reliability in production increases enormously, and unmanned machining overnight and the weekend is now possible to full capacity.

Advantages using SwissCeraMill™ ceramic cutter

1. Cutting rates over 500 m/min in full-face cutting can be realised.
2. HPC feed rates in full-face roughing at 0,08 feed per tooth.
3. HSC feed rates in trochoidal mill cutting at 0,15 feed per tooth.
4. No coating on the cutting tip as the surface is ground very smoothly so that no built-up edge is formed.
5. The cutting edge is very sharp, carefully ground and developed especially for aluminium and non-ferrous metals.
6. All geometries like end-mill cutter, torus cutter, half-round cutter and special milling cutters can be realised.
7. Simple and tested cutting data for machine operatives.
8. Very low spindle load of 10 % instead of 40 % with conventional carbide cutters.
9. Very high dimensional tolerance in the finishing process, measured at 0,002 mm during large-series production.

All values specified are recommendations and can be optimised from application to application.

Time factor as crucial profit factor in production

Current machining tools in aluminium machining have a good service lifetime and achieve good surface qualities. Why should the SwissCeraMill™ ceramic milling cutters revolutionise aluminium machining?

This question can be explained simply as the time factor has not yet been given sufficient consideration. With the SwissCeraMill™

ceramic milling cutter, thanks to higher infeed depths and higher feed rates in the roughing process, enormous time gains can be achieved.

The task was not just trying to get a time saving of 20 % or so, with SwissCeraMill™ one can achieve an up to 400-% time saving: for example, the machining time can be reduced from 8 min to just 1 min 45 s.

Example costing

Material costs are not included.

- Typical hour rate = CHF 120/h
- Number of workpieces = 200 pieces.

Before

- Standard aluminium cutter
- Machining with normal program = 8 min
- Machining time for 200 pieces = 1600 min = 26,66 h
- Costs per piece with normal program = CHF 16.

After

With SwissCeraMill™ ceramic milling cutter:

- Machining time with SwissCeraMill™ = 1 min 45 s
- Machining time for 200 pieces = 350 min = 5,83 h = 5 h 50 min
- Costs per piece SwissCeraMill™ program = CHF 3,50.

Potential cost saving of CHF 12,50 or 457 %!

What is the secret of this success with SwissCeraMill™?

A&L Tool AG and BSQ TECH GmbH are two companies that have pooled their individual expertise in toolmaking and technical ceramics to realise a novel and revolutionary product. Producing companies that need to machine aluminium can now at last look forward to producing faster, with greater precision and at lower cost.



Fig. 2
The SwissCeraMill™

(Figs.: BSQ)