oerlikon balzers

TruStory

# Make way for lead free!

## Optimised tool geometries and BALINIT HARD CARBON improve workpiece machining results.

The prohibition of lead in materials is becoming more widespread. The EU Drinking Water Directive further limited the lead content in drinking water to 10 micrograms per litre already in 2013. The result is that common copper alloys (e.g. CuZn36Pb2As) or free-cutting brass (e.g. CuZn39Pb3) for the manufacture of drinking water plumbing components are no longer on the approved list of the German Federal Environmental Agency. The problem here is that lead facilitates machining processes considerably because it ensures good chip breaking and has a slightly lubricating effect. Many of the inexpensive lead-free or lower-lead substitutes offered on the market, however, increase tool wear due to material smearing, create long ribbon or snarl chips and often make reliable processing impossible.
Those who want to machine brass will find a partner in the Leistritz Tools Academy with their successful concept for complete workpiece machining as well as solutions for materials and coatings.

**Standard tools unsuitable for lead-free materials**
At the Pleystein location, tests with lead-free materials were conducted early on, including for fittings and fitting parts, with sobering findings: Standard tools from conventional brass-machining lines are unsuitable for machining these materials and do not support any useful type of manufacturing.

In new trials for external and internal machining operations, Leistritz experts machined low-lead brass of the material type CW 511 L (CuZn38As) in a six-spindle machine using flatform inserts for external and internal machining with modified geometries using different rake and clearance angles as well as a coating optimised for this application. This approach allowed the manufacture of workpieces with good surface qualities.

**Factbox**

Leistritz

### Leistritz Produktionstechnik GmbH

Production of whirling and keyseating machines and carbide tools.
Core expertise: Development and manufacturing of customer-specific solutions
tools.leistritz.com/en/

### Challenge

- Machining workpieces made of lead-free or low-lead brass

### Objectives

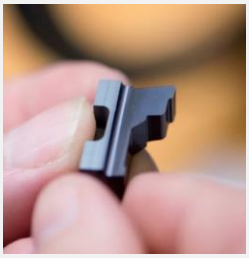
- Tools with improved chip formation
- High surface quality
- Modified cutting edge geometries with different rake and clearance angles
- A hard and wear-resistant coating specifically matched to the tool

### Solution

BALINIT® HARD CARBON

### Advantages

- Ideal sliding properties
- Better chip flow
- Outstanding protection against adhesion and abrasion
- High thermal stability
- Micrometre-thin layer has no effect on the geometry and cutting edge



The chip formation was improved, although there was still a need for optimisation with respect to chip breaking.

**Better chip flow with BALINIT® HARD CARBON**

Moreover, the tools exhibited no optically discernible wear whatsoever after about 500 workpieces, which was due to the use of BALINIT® HARD CARBON. This especially hard and wear-resistant ta-C coating can be applied to every common hard metal – in contrast to diamond coatings. It also provides the ideal properties for the machining of non-ferrous metals: ideal sliding properties and protection against adhesion with a high level of thermal stability as well as high hardness with corresponding abrasion protection. This results in better chip flow as well as increased productivity and process reliability. With a film thickness of only 1 micrometre (µm), the geometry and the cutting edge of the tool retain unimpaired functionality.

For Leistritz, a partner of Oerlikon Balzers for 25 years, the coating is undoubtedly also a significant factor for success in this case. Reinhold Setzer, product manager for tools at Leistritz Produktionstechnik summarises: “We have gained valuable insights that have also been confirmed scientifically, by the way. This enables us to continue optimising the machining of lead-free copper materials in cooperation with our customers and partners based on a comprehensive tool concept that covers the full range of our clients’ machining and product manufacturing needs”.

**About Oerlikon Balzers**

Oerlikon Balzers is one of the world’s leading suppliers of surface technologies that significantly improve the performance and durability of precision components as well as tools for the metal and plastics processing industries. Extremely thin and exceptionally hard coatings, marketed under the BALINIT and BALIQ brand names, reduce friction and wear. The BALITHERM brand opens up a broad range of heat treatment services, whereas BALTONE comprises coatings that are available in a full range of elegant colours, perfectly suited for decorative applications. Under the technology brand BALIFOR, the company develops the technologies for tailor-made solutions for the automotive market, and ePD delivers solutions for the metallization of plastic parts with chrome effects.
Worldwide, more than 1’100 coating systems are in operation at Oerlikon Balzers facilities and its customers. Equipment engineering and assembly of Balzers' systems are processed in Liechtenstein and in Bergisch Gladbach (Germany). Oerlikon Balzers operates a dynamically growing network of more than 100 coating centres in 35 countries in Europe, the Americas and Asia. Oerlikon Balzers is – together with Oerlikon Metco - part of the Surface Solutions Segment of the Switzerland-based Oerlikon Group (SIX: OERL).

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