



KAMAZ

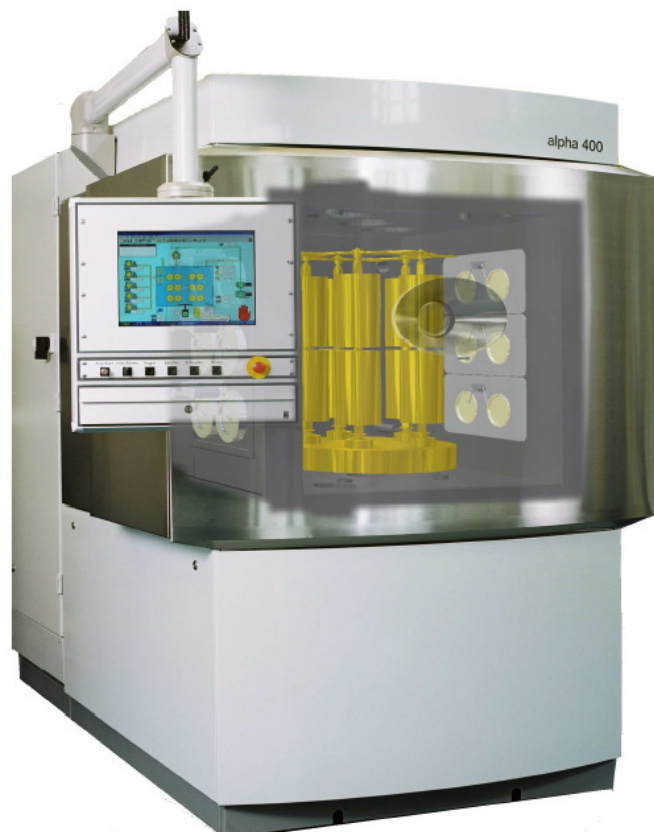
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Company

REPAIR AND TOOL MAKING PLANT

Wear protection coating

2020

EIFELER Integrated line for wear protection coating (Germany)



Alpha 400 is a flexible and efficient PVD (physical vapor deposition) system prominent for a short cycle time and easy operation. The process is based on Arc-PVD technique and designed for deposition of a wearproof hard and tribological carbon-based coating for high-speed steel and cemented carbide tools at temperature of $\leq 500^{\circ}\text{C}$. Integrated line together with EIFELER innovative technologies for surface treatment (incl. pretreatment) and coating deposition allows to process tools surfaces, steel and cemented carbide components with competitive coatings both standard ones such as TiN, TiCN, CrN, CrCN, ZrN, and TiAlN-, TiAlCN- or TiAlSiON-based multiplex coatings as well as nanocoating of the following registered trade marks such as:

EXXRAL® *plus and nc (SISTRAL)*,
 VARIANTA®, EXXTRAL® *blue*,
 EXXTRAL *rosé*, *nano* VARIANTIC,
 KORAL and SUPRAL.

Stowage space of powder spray booth is 425 mm in diameter and 480 mm in height. Maximum feeding is 300 kg. Tools made of high-speed steel and cemented carbide with a diameter of 1 to 425 mm and of 480 mm in height can be coated by this machine.



Elements of Integrated line



Old coating needs to be removed prior to deposition of coating particularly to gear cutting tools.

All titanium- and aluminum-based layers may be decoated from cemented carbide materials. As80 PLRS single-chamber decoating plant by Absolut Decoating Technology comes as a part of the line. Old coating can be decoated with the help of chemical agents within 2–8 hours.

ECONOMY type plant for hydroabrasive treatment by GRAF is used for tool bit deburring. All technological operations are fully automated.

One more identical plant is used for chamfering and surface activation to improve adhesion, the difference comes from application of different abrasive materials. In the first case it is aluminum oxide, in the second case those are ceramic balls of 50–120 micron size.

By means of these operations one may increase tool performance by approximately 30%.



Elements of integrated line

Water cleaning with nine tanks and drying module meets modern international standards. Elements of cleaning plant are as follows:

- 1 x purging,
- 1 x cleaning (with ultra sound),
- 1 x purging,
- 1 x cleaning (with ultra sound),
- 3 x purging,
- 2 x drying (hot air).

Additionally, a loading ramp and a robot for moving of cleaning crates from one tank to another make a part of the line. Crate size for placing of tools makes approximately 300 x 300 mm.

Reverse osmosis plant is used for water treatment that allows to achieve an excellent quality of tools washing.



Microfluidic and polishing equipment is used for machining of tools with complex shape, for cleaning of inner passages of boring tools as well as for improving of corrosion-inhibiting, antifrictional and wearproof qualities. This equipment is used after application of coating and allows to get a perfect result in surface undulation that enhances tool durability by 20%. Glass beads of 20–30 micron are used as abrasive material in the course of microfluidic cleaning and special polymeric material with diamond powder is used for polishing.



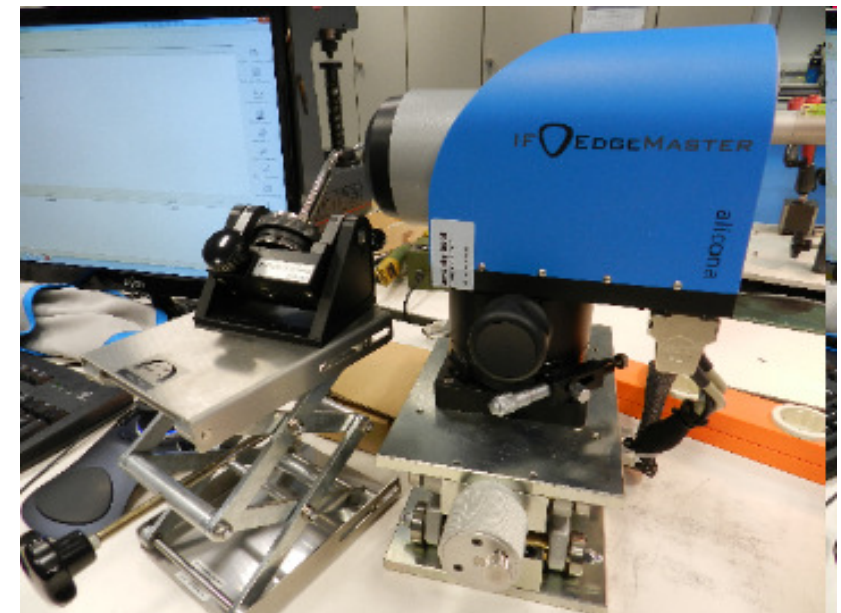
Elements of integrated line



QCP consists of:

- Device for grinding of semi-spheres that can be used for all types of tools not only for even and flat samples;
- Optical microscope with magnification up to 90-times for incoming and outgoing control (prior to and after coating);
- Optical microscope with high resolution (up to 1000 times) to measure coating thickness and its adhesion with a tool;
- Software for computer-aided calculation of layer thickness;
- Rockwell hardness tester.

Alicona optical device is used to control curvature of cutter bit. It can be used to check surface undulation.



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