

Press release

Vibratory grinding of precision turnings and millings

Vibratory grinding in the general sense is not particularly renowned for its ability to accurately process workpieces with fine tolerances in terms of uniform edge rounding and surface smoothing. The expression 'vibratory grinding' evokes the notion of instantly rounded corners, battered dark grey surfaces, a high noise level during processing, cumbersome handling and long processing times.

Over the last few years OTEC Präzisionsfinish GmbH has proven that this need not be so. Even the company's name embodies the notion of precision finishing. OTEC's machines and processes were developed among other things specially for processing high precision and highly accurate turnings and millings. OTEC's CF series of machines can fulfil the following requirements:

- considerable increase in the percentage contact area, resulting in a better seal at the bearing surface of rotary shaft seals and extending the life of the part
- extremely reliable and accurate edge rounding, e.g. 0.6 µm for pistons in the automobile sector in the high pressure range up to 2,000 bar.
- halving the initial surface roughness
- high quality bright surfaces
- deburring of external drill holes.



Fig. 1: CF 18 machine with Unisepa

Process description (see fig. 1 - CF 18 machine):

In this process mainly disc finishing machines of the type CF series are used. The machine works as follows:

The process container consists of an open barrel, the base of which is free to rotate on bearings. This barrel is filled with a grinding medium, e.g. triangular granules 4 x 4 mm in size. When the machine is then switched on, the medium moves in a toroidal vortex (see fig. 2).

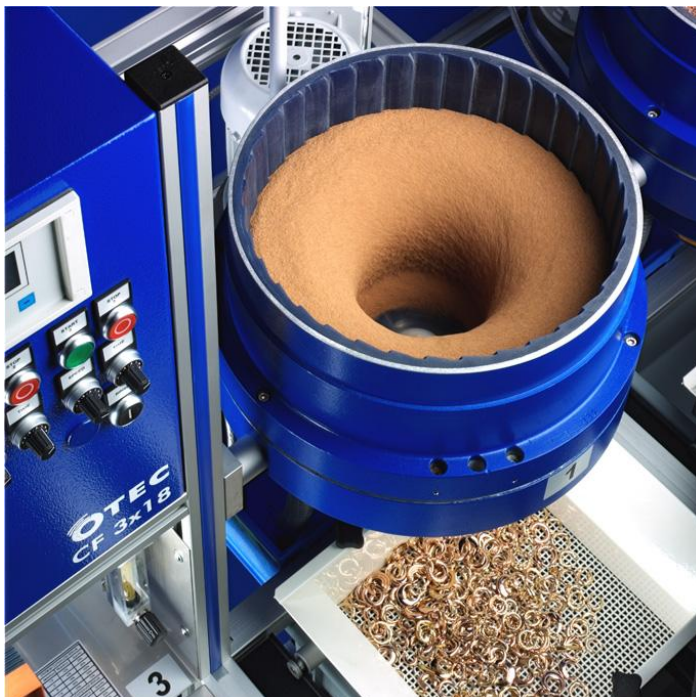


Fig. 2: CF 18 process container

Now the workpieces are added. A predosed compound/water mixture is added automatically. The compound consists of a tensidic cleaning agent designed to:

- act as anti-corrosive
- keep the workpieces and abrasive media clean
- remove dirt
- create bright surfaces if required

During the process the compound/water mixture flows through the container and removes the grinding residues. This keeps the workpieces relatively clean during processing. As the centrifugal force causes the grinding media and the workpieces to move in the same direction, they make contact with each other at high pressures. This produces a very efficient grinding or polishing effect.

When the polishing process is complete, the mixture of grinding media and workpieces is tipped into a separator and the workpieces are drained off.

O TEC's outstanding expertise is especially evident in the following features:

1. Flow-optimised barrel design, i.e. the abrasive granules flow in the same direction as the workpieces. This reduces the negative effects of impact and results in smoother surfaces and more uniform edge rounding.
2. Gap design: The area between the rotating container bottom (otherwise known as the disc) and the fixed wall of the container is the critical area in disc finishing technology. This is where thin workpieces or chips can get become lodged and cause increased wear. Here O TEC has quite clearly set the standards in recent years and can offer several variations to match the particular process in hand; e.g. the so-called zero gap technology with which it is possible to set the gap to "0".

3. Utmost flexibility. The CF machine from OTEC is suitable for:

- deburring
- edge rounding
- polishing
- smoothing

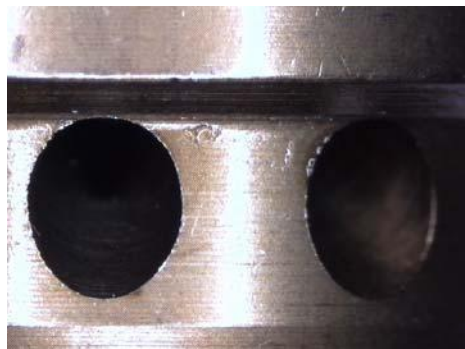
of workpieces in metal, ceramic, plastic, etc.

If required, the machine can be filled with a cooling lubricant or with grinding oils instead of with the compound/water mixture.

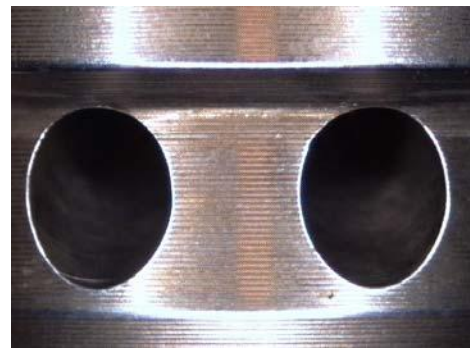
4. OTEC has extensive know-how in process technology. The right choice of grinding and polishing medium is extremely important. The size of the granules is determined by its separability, the demands of surface quality and the degree of grinding required. The choice of grinding media shape depends on the geometry of the workpiece. There are also processes in which a grinding and polishing can be achieved in a single stage. This eliminates the need for a separation stage between the two processes.

Processing example:

The workpiece shown below is a turned part. The processing task in this instance was to debur the holes.



before



after

The processing time was 30 minutes.

By choosing the right abrasive medium in the right size it was possible to debur the holes 100 per cent.

The company:

OTEC is a medium-sized manufacturer of drag finishing and disc finishing machines. Founded in 1996 by Helmut Gegenheimer, the company has successively established itself on the market through new machine concepts and numerous patented processes - first in the jewellery industry then increasingly in the toolmaking, pharmaceuticals and automotive industries as well as in medical and CNC processing technology. The key has always been new, better solutions which were superior to the surface treatment processes previously in use. Today OTEC is the technological leader in many markets and maintains a worldwide presence with branches of its own.

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