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LATEST MASS FINISHING TECHNOLOGY FOR GRINDING AND VERY FINE POLISHING OF IMPLANTS

OTEC Präzisionsfinish GmbH is one of Germany's leading manufacturers of mass finishing systems for grinding and polishing medical implants. A particular highlight of the product range is the so-called drag finishing units which are used for grinding and very fine polishing or mirror finishing of high-quality workpieces which must not come into contact with each other during the process. Such products include cutting tools, knee implants and hip implants.

The process

In the drag finishing process, the workpieces are clamped in a holder and dragged through a grinding or polishing medium. In order to maximize the efficiency of the process, the workpiece rotates around its own axis, while moving in a planetary orbit. All key parameter such as workpiece rotation speed, drag speed, immersion depth, compound concentration and of course the processing time can be preselected on a Siemens touch panel. This ensures that the process is absolutely stable and repeatable.



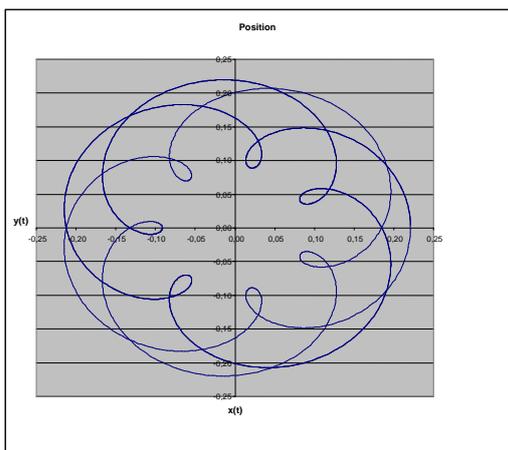
2-stage drag finishing machine type DF-5 S2

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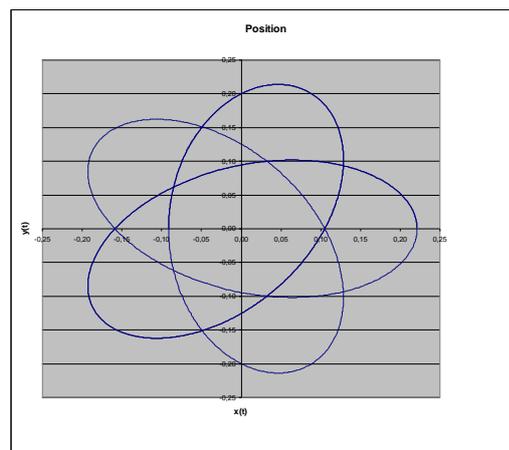


Workpieces are clamped in a holder of Ra 3.25 μm to Ra 0.01 μm . By using a second drive unit, the rotation of the workpiece and the rotor can be set independently of each other. This makes it possible to define a wide variety of paths.

In order to process the workpieces as efficiently as possible and to obtain the best possible surface finish, it is often necessary to use a 2-stage process. In this case, the workpieces are typically processed by wet grinding in the first stage and then dry polishing in the second stage. This enables, for example, workpieces made of cobalt chrome (CoCr) to be smoothed from an initial value



Workpiece holder rotating against the direction of the rotor



Workpiece holder rotating in the same direction as the rotor

The different speeds and accelerations that result can have a significant influence on the grinding effect of the medium, obtained simply by the selection of speed and direction of rotation.

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Advantages of the OTEC drag finishing units:

1. The workpiece can be changed at the touch of a button

A new chuck system enables the workpiece to be changed at the touch of a button. A hex fitting is used to transfer the torque. In order to fit the workpiece holder in place, it is simply inserted into the socket and locks in place automatically. It can be removed at the touch of a button.



Changing the workpiece in the independently rotating holder

2. A more uniform finish is obtained by means of an angled and independently rotating workpiece holder

OTEC drag finishing units make it possible to work with independently rotating holders. In this process, each workpiece additionally rotates on its own axis. Furthermore, the holder can be set at an angle, which in particular produces a much better finish on the front surface and inside of workpieces. This results in numerous advantages, such as:

- a better finish at the ball center of hip joint balls
- a more uniform finishing of femorals
- better finishing of the femoral box
- ideal finishing of the front face of tibias



The holder is set at an angle; each workpiece rotates independently

3. Cover for femorals

From a point of view of work flow, it makes sense to sandblast the reverse side of femorals before grinding and polishing. In order to avoid any adverse changes to the sandblasted surface during the grinding and polishing process, OTEC has developed a special cover, which also serves to fix the holder in place.



Angled, independently rotating workpiece holder with tibia

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4. Flexible media container bottom for high quality surface finishing

As a result of static pressure, the intensity of the finishing process is proportional to the immersion depth. This means that greater finishing forces apply nearer to the bottom of the media container – with consequently shorter finishing times. As a rule, the bottom of the media container is hard and rigid in construction. When grinding implants, ceramic or plastic bonded grinding media are used, which can easily be ground down by the rotary motion of the workpieces and the hard bottom of the media container. When a flexible bottom is used, this simply cannot happen, because the bottom itself yields to increasing pressure. This prevents the surface of the workpieces from being struck and avoids any selective compacting of the surface. This gives the best possible preparation for the subsequent polishing stage, since there is absolutely no risk of pimples or orange skin effects.



Flexible drum bottom

5. Blasting system after wet grinding process

OTEC has developed a blasting device to prevent any abrasive media from being carried over into the polishing process. In this process, the workpiece holder travels to a given position where it is blasted clean for a predefinable time. This reliably prevents any abrasive media from being transferred to the polishing stage.



Blasting system

A good product results from the interaction of a variety of individual details. And it is precisely here that the advantages of the OTEC machines come into their own. A combination of many tiny, practical details gives rise to the best possible product, which



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can be customized to the specific needs of the customer. The result is consistently reliable, perfect surfaces of the highest quality. Taken together, all these various components ensure that OTEC offers the best possible results for the surface finishing of implants.

The company

Otec GmbH offers precise technology for perfect surface finish. Otec machines for deburring, grinding, smoothing and polishing guarantee an efficient and perfect surface finish of tools and products. Operating a worldwide distribution network comprising over 60 agencies, Otec is represented locally for international customers from various industries. Thousands of customers benefit from the extensive know-how of the technology leader Otec in the development of a perfected interplay of machine and process media.

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