PRESS RELEASE

Surface finishing for implants

Smoother than nature

Nothing lasts for ever – at least not in endoprosthetics. Even the very best quality of implant has only a limited life. One of the main factors in this is the quality of the surface finish. OTEC Präzisionsfinish GmbH has extended the range of applications for automated grinding and polishing processes to medical engineering. This means that a new dimension in surface finishing can be achieved during the manufacture of medical implants.

Different types of implant place vastly differing requirements on the surface finish. Depending on the field of application, there are a number of criteria which determine the quality of the product: a highly accurate fit, a homogeneous surface, pronounced or minimal edge rounding. Combined with the complexity of the shapes normally involved, these factors have hitherto made reliable automated processing virtually impossible.

Cost-effective and consistent quality

As a result of several years' work, OTEC Präzisionsfinish GmbH has developed special parameters for the drag finishing and disc finishing processes to meet the particular requirements of implant manufacturing. This makes it possible to achieve fast and economical surface finishing combined with consistent quality. Workpieces of any shape and weight can be deburred, ground, smoothed or polished in a very short time. This is performed by moving the workpieces through a customised composition of abrasive media, whereby the workpieces themselves are either loose or fixed in a rotating holder.

Joint replacements

In the case of hip or knee joints, a homogeneous, very smooth and highly polished surface is demanded of the contact areas. For this purpose OTEC has developed a special dry process for drag finishing. In this process the workpieces are clamped in suitable holders and dragged through the appropriate grinding and polishing media in a number of stages. Clamping the workpieces prevents them from damaging each other. The processing results depend on determining the ideal clamping angle. This enables R_a values of 0.03 µm to be achieved.

Bone screws and dental implants

Bone screws and dental implants are made of special stainless steel or titanium alloys. In order to obtain a good fit, unrounded but bur-free edges are required as far as possible. A smooth, polished surface is conducive to easy insertion and removal. Furthermore, the smooth surface simplifies the process of disinfection immediately before use. OTEC has developed a way to fulfil all three requirements in a single process. By using a disc finishing machine it is possible to create a smooth, highly polished surface without any significant edge rounding. After this single-stage process the workpieces are light in colour, have a pristine finish and exhibit a much higher quality. In this process R_a values of 0.03 µm can be attained.

Bone plates

In contrast to this, bone plates usually require a considerable degree of edge rounding and the surface should be as smooth and homogeneous as possible. Here, too, a disc finishing machine is used, albeit with different process parameters. This enables all traces of stamping and chip removal operations to be removed in a very short time and produces a smooth, high-quality surface.

Ear moulds

So-called otoplastic parts for hearing aids or hearing protectors are made from special plastics in a rapid manufacturing process. This manufacturing process creates a rough surface which does not provide the accurate fit and comfort required for insertion into the human ear. OTEC has developed a process with which the ear moulds can be ground in a disc finishing machine in a relatively short time. The special design of the machine gives a very high-quality smooth surface finish in a process that is gentle on the material. This means that sensitive workpieces can be processed very quickly and reliably without fear of damage, eliminating the need for complex and time-consuming manual polishing and the quality variations associated with manual processes.

From consultation to series production

In order to best fulfil the requirements of each individual application, it is essential to determine the ideal combination of all relevant process parameters. This includes amongst other things the choice of process, the composition of the processing media, the speed of rotation, the processing time and (in the case of drag finishing) the clamping angle.

For both processes OTEC supplies machines in a variety of sizes, from bench top units to fully-automatic plants. As for the choice of the right medium, potential customers are invited to have a sample of their product processed free of charge at OTEC's research laboratory. This service is available to customers all over the world. Systems for separating the finished workpieces from the processing medium and for reprocessing the water used complete the OTEC range of products.

Photos

Fig 1: A mirror finish but with precise edges – no problem with a process developed by OTEC (photo: OTEC)

Fig. 2: A perfect surface extends the life of replacement joints (photo: OTEC)

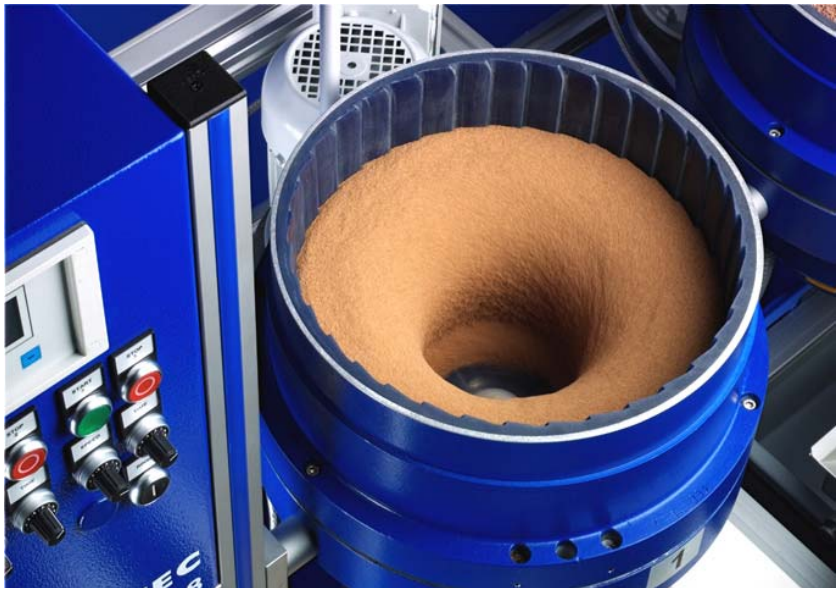

Fig 3: The right mixture for precision: disc finishing machine from OTEC (photo: OTEC)

OTEC Präzisionsfinish GmbH

OTEC GmbH supplies precision engineering solutions for creating perfect surfaces. OTEC machines for deburring, grinding, burnishing and polishing are used for the efficient surface treatment of tools and manufactured goods. With a network of over 60 agencies, OTEC is present all over the world to provide a local service to international customers form many different industries. Customers can benefit from OTEC's comprehensive expertise as the technology leader experienced in developing the perfect interplay of machine and processing medium.

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