

# THE COMPANY

Founded in 1996, OTEC has quickly established itself as the market's technology leader by developing new machine concepts, inventions and improvements. OTEC supplies machines which are carefully tailored to the needs of specific industries, these are truly impressive in terms of cost-effectiveness, handling and precision, and which are far superior to conventional systems. Around 100 members of staff are employed at the company's headquarters in Southern Germany. A global sales network ensures excellent worldwide support, and world beating finishing are always guaranteed.

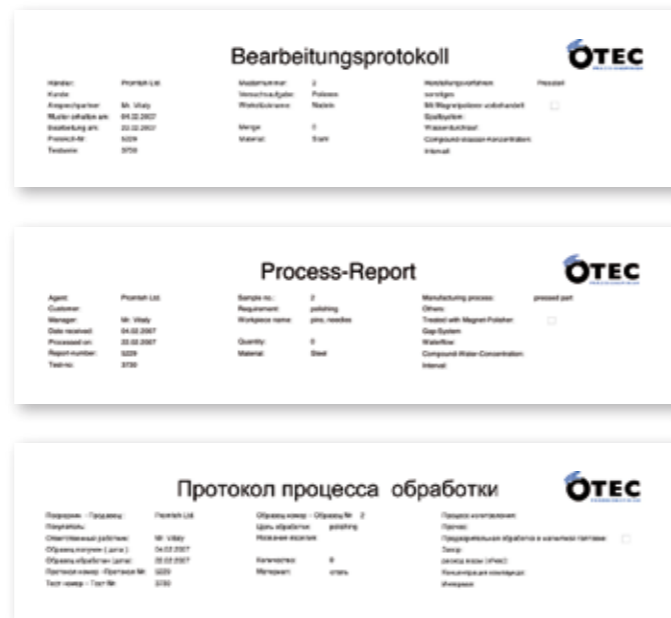


## VISIBLY BETTER!

Form your own impression of the performance capability of our different machine series - simply send us a sample part that we can process in our laboratory. We will send you a comprehensive report, customized to your application, complete with details of the grinding and polishing media used and process parameter settings, available in 12 different languages.

Naturally, at no cost or obligation and absolutely confidential.

**Request proof of the better technology.**



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# SURFACE FINISHING FROM THE MARKET LEADER

In medical and dental technology

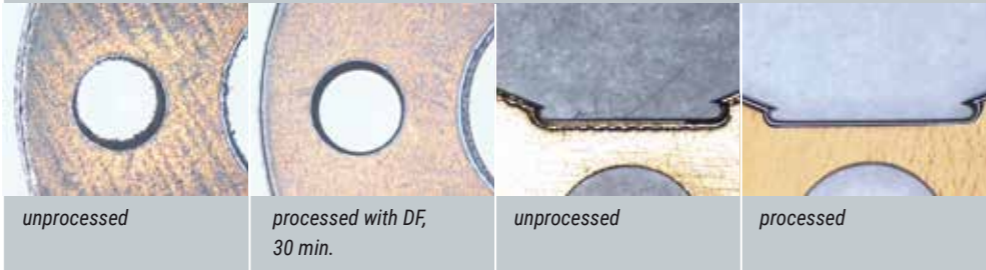
The process

Whether centrifugal disc finishing process (CF) or drag finishing process (DF): OTEC has developed high-quality machines for both mass finishing which ensure perfect work piece surfaces in medicine and dentistry. And up to 10-times more effective than conventional processes.

OTEC offers its machines in various sizes, from table-top units for efficient small series production to industrial large series – as required. Thus OTEC machines are ideal for numerous areas of application of medicine and dental technology such as surgical implants (bone plates, bone screws and joint implants), dental implant, teeth, dental tools and orthodontic products but also for ear shells and stents in vascular surgery. In addition to the machines, OTEC supplies the appropriate polishing and grinding media for optimal results.

**Advantages at a glance**

- ▶ Efficient for small and large series processing
- ▶ Process security
- ▶ Homogenous surface processing "better than hand polishing"
- ▶ Up to 10 times more effective
- ▶ Specially customized machine equipment for medical technology



## SURGICAL IMPLANTS

For high-strength implant materials such as CoCr, various stainless steel alloys, as well as ceramics and plastics. Our machines create perfect surfaces with the smallest surface roughness in a system-secure and efficient manner according to the demands of modern surgery.

**The machines**

Joint implants, tibias, femurs: <b>DF dry, DF wet</b>	page 4
Bone plates: <b>HV 20</b> (up to 500 mm long), <b>CF, CF-T</b> (80 - 120 mm)	page 6
Bone screws, small bone plates: <b>CF-SP, CF-T</b>	page 8



## DENTAISTRY

For the various dentistry materials as well as very small work pieces from soft to hard. OTEC machines are perfectly suited to the demands of dentistry:

- ▶ Dental implants
- ▶ Teeth
- ▶ Dental tools
- ▶ Orthodontics products

**Machine and processing information**

Implants, teeth: <b>CF-SP, CF-T</b>	page 10
Dental tools, orthodontic products: <b>CF</b>	page 12



## EAR SHELLS

For the contour-precise grinding of extremely rough surfaces, as well as for the creation of very fine plastic surfaces.

<b>Special processes and machines: CF, ECO-Maxi</b>	page 14
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## MACHINE OVERVIEW

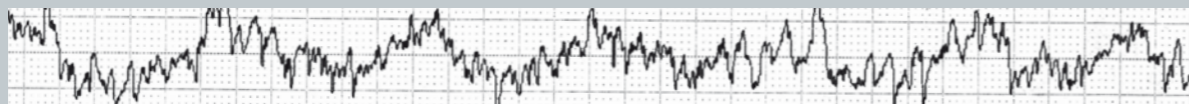
<b>Areas of application and equipment features</b>	from page 15
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# JOINT IMPLANTS, TIBIAS, FEMURS ...

Perfect highly polished surfaces, not even the smallest scratch and surface roughness of 0.01 µm with absolute process security, also for highly complex open form surfaces. That distinguishes the drag-finishing machine DF from OTEC. Depending on grinding and/or polishing granulate, maximum surface shine can be achieved even with the most diverse materials. OTEC is currently the only manufacturer in a position to achieve perfect surfaces also for ceramic implants.

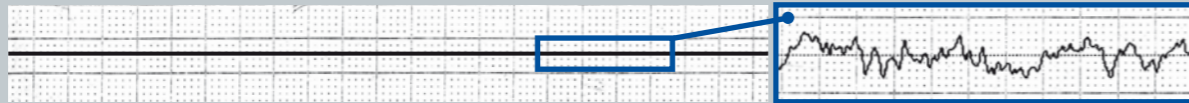
Surface processed on a CNC grinding machine

Ra: 1,23 µm  
Rz: 7,9 µm



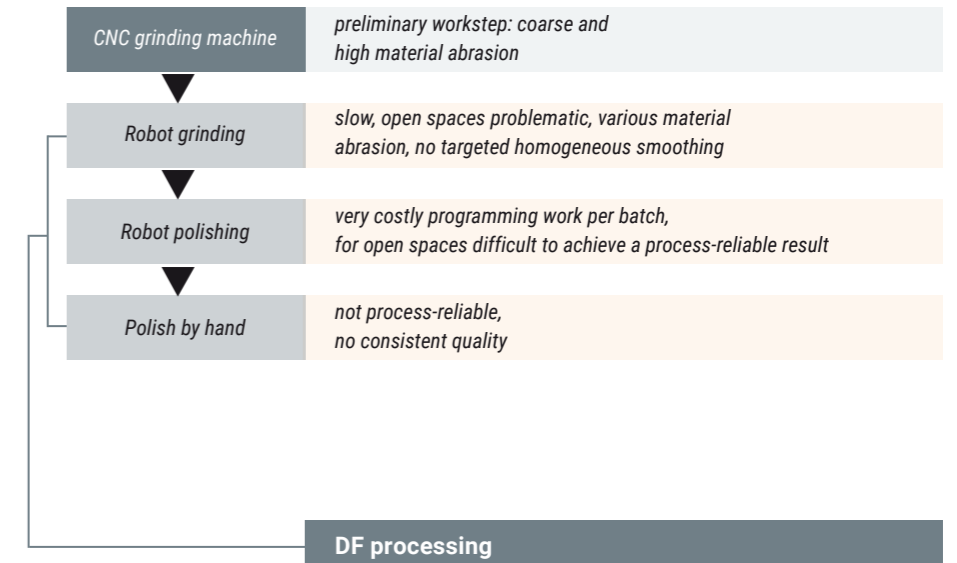
Oberfläche nach OTEC-DF-Bearbeitung

Ra: 0,01 µm  
Rz: 0,1 µm



## The machines

## Current manufacturing process



The DF simplifies complicated process steps. Particularly for open spaces, the process is extremely efficient, while also producing better, more reliable and consistent results. In the end, the resultant finish exceeds the smoothness that can be achieved using hand polishing, without scratches or orange peel. The process is extremely efficient, while also producing better results.

### DF WET / DF DRY

Wet and dry processes for uniform abrasion or for absolute high gloss polishing. Due to the fast motion, high surface pressures are created between the workpiece and the processing medium. This creates very smooth surfaces which result in the high gloss finish like hand polishing in a very short time and with the highest degree of process stability. Depending on the material to be processed, any combination of wet and dry processes can be used. Available in a wide range dimensions and sizes - matched to the respective work piece to be processed.

#### Special features

For the multi-stage DF machines the change from wet to dry processing occurs automatically without interrupting the finishing process. The total process is accelerated. Angled and driven holders guarantee an all around processing into the smallest corners such as for tibias. Thus perfectly smooth surfaces are also achieved in work piece under cuts.

#### Advantages

- ▶ Surfaces under 0.02 µm in extremely short processing time
- ▶ Highly cost-effective
- ▶ Automatic change from wet to dry processing
- ▶ Very compact design with high output
- ▶ Process-reliable
- ▶ Simple operation
- ▶ Surfaces free of defects

For further information and basic equipment, see page 16.



Before:  
line-ground



After:  
Absolutely free of scratches.  
A high-gloss polished knee joint  
with Ra values up to 0.01 µm



OTEC-SERIES DF



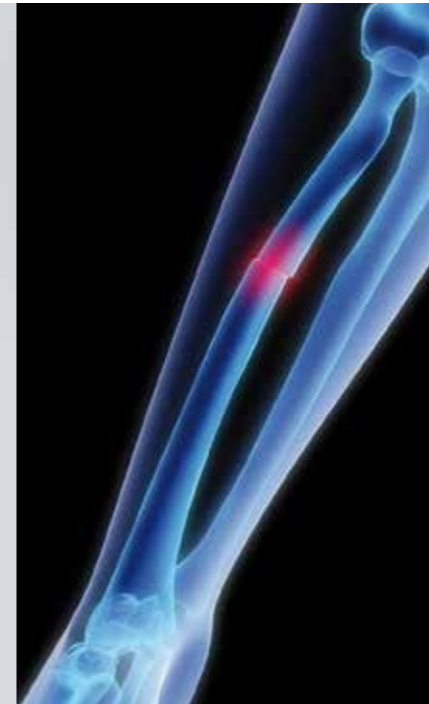
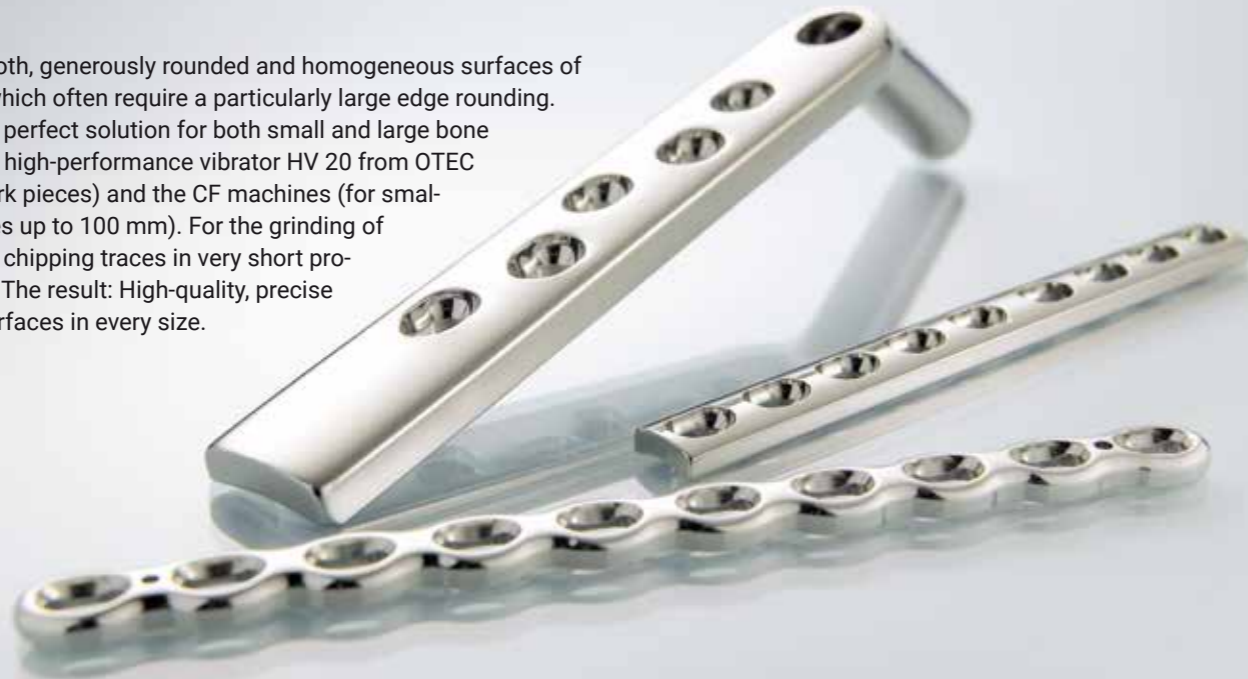
Hip joint with  
homogeneous,  
high-gloss polished  
surface using the  
drag- finishing  
process.



Surgical implants:

## BONE PLATES, PRECISION IN THE SURFACE

Ideal for smooth, generously rounded and homogeneous surfaces of bone plates which often require a particularly large edge rounding. OTEC has the perfect solution for both small and large bone implants. The high-performance vibrator HV 20 from OTEC (for larger work pieces) and the CF machines (for smaller work pieces up to 100 mm). For the grinding of punching and chipping traces in very short processing time. The result: High-quality, precise bone plate surfaces in every size.



The machine

### OTEC-SERIES CF



OTEC-SERIES HV

### FOR LARGE BONE PLATES: THE HV 20

(up to 500 mm long)

With the principle of a vibrator, the high-performance vibrator HV 20 creates perfect surfaces due to a homogeneous abrasion and is up to 65 % faster than comparable machines. Adjusted to work piece and media, it operates with exactly defined oscillations which produce a vibratory grinding effect due to relative motion of abrasives and work piece. Depending on machine geometry, bone plates up to 500 mm in length can be processed.

#### Advantages:

- ▶ Especially for large bone plates up to 500 mm in length
- ▶ Up to 65 % faster than comparable machines on the market
- ▶ Multiple work steps in one: from burring to wet polishing with a high-gloss surface of Ra: < 0,04 um

For further information and basic equipment, see page 17.



Strong edge rounding and perfect surfaces.



The patented gap system enables the usage of very fine-grain polishing media. Result: High-gloss surfaces as if polished by hand.

### FOR SMALL BONE PLATES: THE CF, OR THE CF-T

(from 0 - 80 mm)

High-performance centrifugal disc finishing machines, the CF-T in compact table-top design. The unique, patented gap system between the disc and the process container enables the gap to be set with an accuracy of 0.05 mm when using the CF machine for dry processing. This means that very thin work pieces can be processed and that the very best results can be achieved by using extremely fine abrasive media. And all that for a very attractive price-performance ratio.

**A recent enhancement to the CF-T is the CF-SP for surgical implants which is described in the following sections p. 9**

#### Advantages:

- ▶ Especially for smaller bone plates (up to 80 mm in size) and small quantities
- ▶ Compact table-top design
- ▶ Patented gap system for the usage of very fine polishing media

For further information and basic equipment, see page 15.

Surgical implants:

## BONE PLATES AND BONE SCREWS

The CF series machines are particularly suited for the treatment of implants made from stainless steel or titanium alloys as well as plastics and ceramics. Work pieces can be reliably deburred without appreciably rounding the corners in the process, which is very important for bone screws. OTEC has developed a special process in order to achieve a smoothing of the surfaces with subsequent polishing in the  $\mu\text{m}$  range, which can all be done in one process. Ra values of  $0.02 \mu\text{m}$  are possible here. The CF series is also suited for the complete rounding of bone plates.



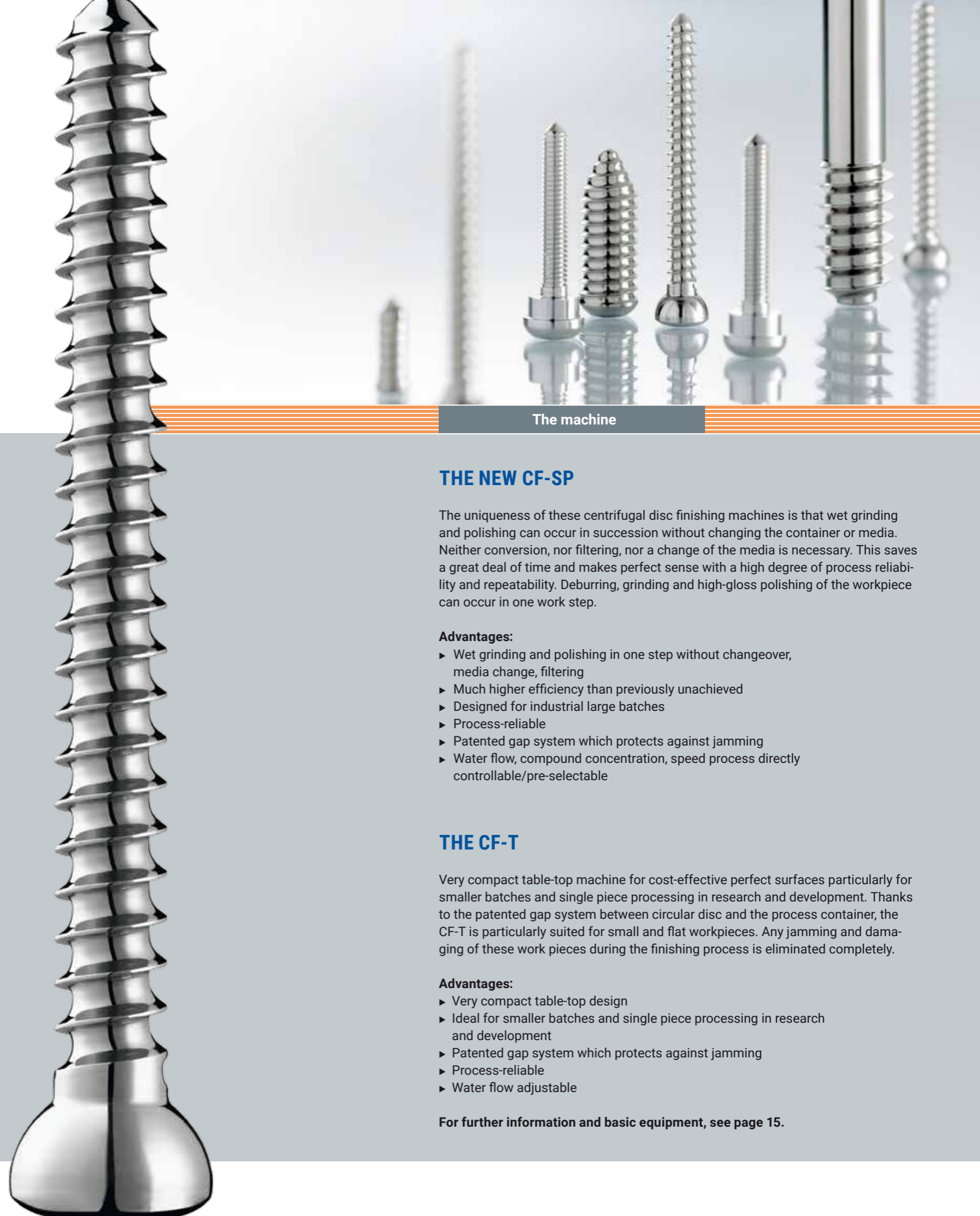
Treated hand bone plate with defined rounded edges and specifically achievable surface roughness.



High-gloss polished bone screw.



OTEC-SERIES CF



The machine

### THE NEW CF-SP

The uniqueness of these centrifugal disc finishing machines is that wet grinding and polishing can occur in succession without changing the container or media. Neither conversion, nor filtering, nor a change of the media is necessary. This saves a great deal of time and makes perfect sense with a high degree of process reliability and repeatability. Deburring, grinding and high-gloss polishing of the workpiece can occur in one work step.

#### Advantages:

- ▶ Wet grinding and polishing in one step without changeover, media change, filtering
- ▶ Much higher efficiency than previously unachieved
- ▶ Designed for industrial large batches
- ▶ Process-reliable
- ▶ Patented gap system which protects against jamming
- ▶ Water flow, compound concentration, speed process directly controllable/pre-selectable

### THE CF-T

Very compact table-top machine for cost-effective perfect surfaces particularly for smaller batches and single piece processing in research and development. Thanks to the patented gap system between circular disc and the process container, the CF-T is particularly suited for small and flat workpieces. Any jamming and damaging of these work pieces during the finishing process is eliminated completely.

#### Advantages:

- ▶ Very compact table-top design
- ▶ Ideal for smaller batches and single piece processing in research and development
- ▶ Patented gap system which protects against jamming
- ▶ Process-reliable
- ▶ Water flow adjustable

For further information and basic equipment, see page 15.

Dentistry:

## IMPLANTS, TEETH



The machines

## Deburring without appreciable edge rounding

Deburring and creation of smooth surfaces are essential in dentistry. Therefore the CF-SP and CF-T are the ideal devices when implant surfaces and teeth made from stainless steel and titanium alloys as well as ceramic must be smoothed and polished - perfectly completed to the  $\mu\text{m}$  range. The process developed by OTEC allows for Ra values of  $0.03 \mu\text{m}$  - and all that in one single work step.



*Implant screws, perfectly deburred, ground and polished to a high gloss - processed in one single work step with the OTEC machine CF-SP - and the sharp edges remain.*



*Fine and soft ceramic or plastic surfaces such as tooth implants in small and large series-CF. It is particularly important here that deburring, smoothing, and polishing occur without appreciable edge rounding.*

### THE NEW CF-SP

With this centrifugal disc finishing machine, wet grinding and polishing can occur in succession without changing the container or media. This offers time savings and makes perfect sense with a high degree of process reliability and repeatability. Deburring, grinding, and high-gloss polishing of the work piece: all in one single step.

#### Advantages:

- ▶ Wet grinding and polishing in one step without container or media change and filtering
- ▶ Previously unachieved high efficiency
- ▶ Designed for industrial large batches
- ▶ Process-reliable

### THE CF-T

Very compact table-top machine for the cost-effective finishing of perfect surfaces particularly for smaller series and single processing in research and development. The patented gap system between the circular disc and the process container makes the CF-T particularly suited for small and flat workpieces. Any jamming and damaging of these work pieces during the finishing process is eliminated completely.

#### Advantages:

- ▶ Very compact table-top design
- ▶ Ideal for smaller batches and single piece processing in research and development
- ▶ Patented gap system which protects against jamming
- ▶ Process-reliable
- ▶ Simple to handle and operate

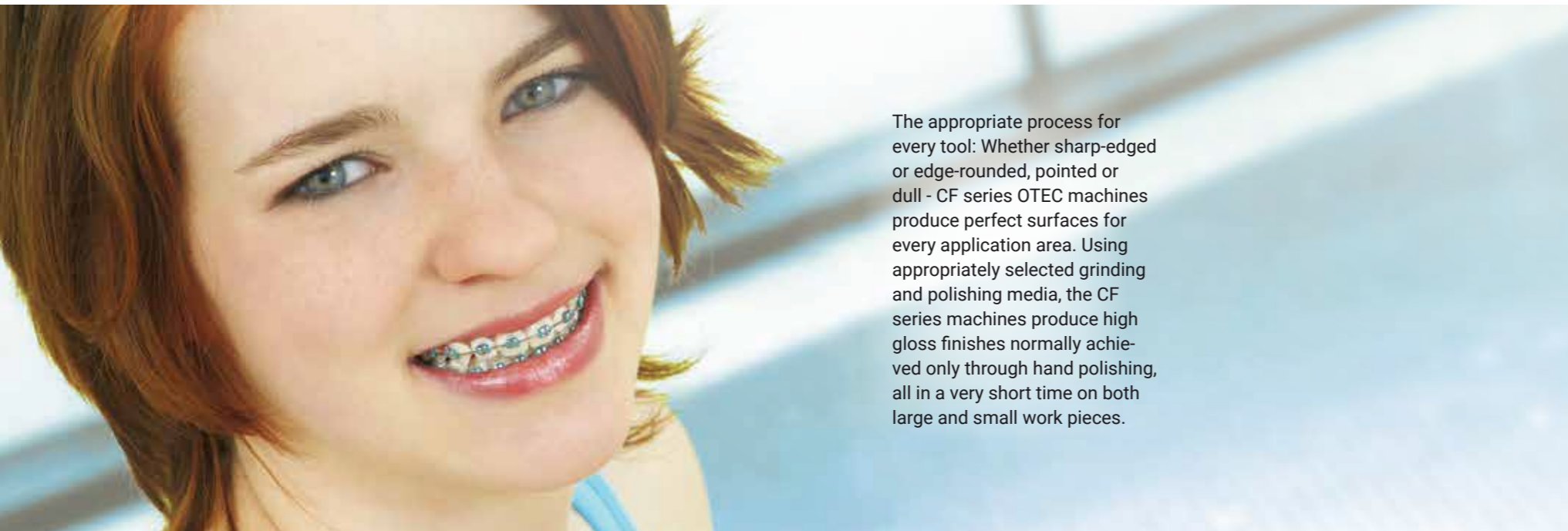
For further information and basic equipment, see page 15.



OTEC-SERIES CF-T

Dentistry:

## ORTHODONTIC AND DENTAL TOOLS



The appropriate process for every tool: Whether sharp-edged or edge-rounded, pointed or dull - CF series OTEC machines produce perfect surfaces for every application area. Using appropriately selected grinding and polishing media, the CF series machines produce high gloss finishes normally achieved only through hand polishing, all in a very short time on both large and small work pieces.



OTEC-SERIES CF

### The machines

#### BRACKETS



Durable and ready-to-use thanks to perfect polishing.

#### WIRES



Inner wires with efficiently treated surfaces without deformation or damage occurring.

#### ORTHODONTIC TOOLS



Perfect surfaces for perfect instruments.



Even with complex, detailed geometries, perfect surfaces are no problem for machines of the CF-series from OTEC.

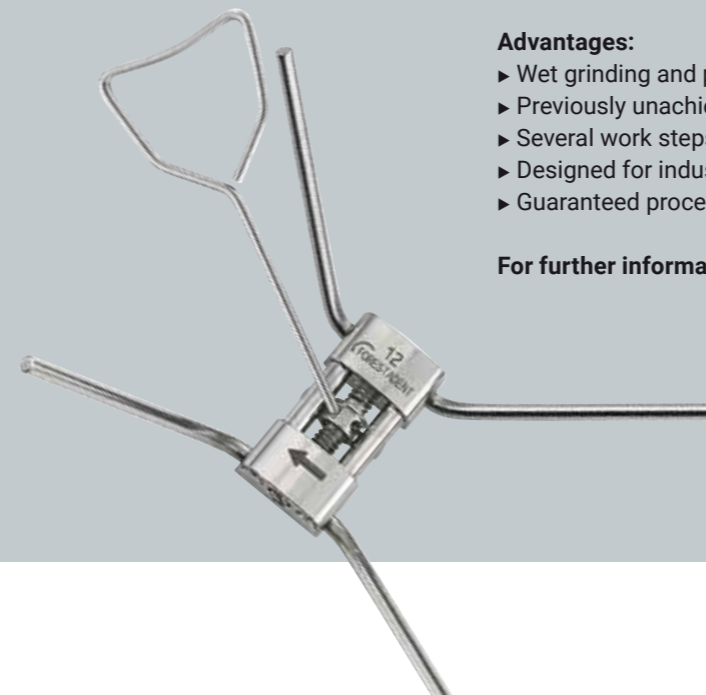
#### CF-SERIES

Ideal for sharp-edged orthodontic and dental tools with highly polished, finished surface without appreciable edge rounding. CF machines take care of deburring, grinding and polishing of even the smallest work pieces in one step. Using suitable polishing granulate in an open top container in the smooth grinding process, the tools move in a toroidal motion which creates a gentle movement through the media while the parts are ground and polished. This produces the high gloss without the products losing their sharp edges.

##### Advantages:

- ▶ Wet grinding and polishing in one step without changing the equipment.
- ▶ Previously unachieved high efficiency
- ▶ Several work steps without changing the container or media.
- ▶ Designed for industrial large batches
- ▶ Guaranteed process reliability

For further information and basic equipment, see page 15.



# EAR SHELLS (RAPID SHELL MODELLING) FOR HEARING AIDS

Surfaces for custom-fit perfection



Surfaces of ear shells are initially too rough to guarantee proper fit and comfort in the human ear. OTEC machines grind and polish the plastic surfaces both gently and with guaranteed process reliability in the shortest time. This replaces the time-consuming and difficult manual grinding process.

## The machines

### FOR INDUSTRIAL PROCESSING: THE CF

- ▶ A patented gap system enables the usage of very fine polishing media
- ▶ 500 individual processing programs can be stored
- ▶ Serial efficient processing

### FOR LABORATORIES AND SMALL BATCHES: THE ECO-MAXI

- ▶ Cost-efficient versatile tool for small batches
- ▶ Wet, dry and magnet polishing
- ▶ Short processing times
- ▶ Small foot print



# AN OVERVIEW OF THE MACHINES

	CF	CF-T	CF-SP
Areas of application	Surgical implants: for industrial batch production  Dental implants – industrial batches  Orthodontic and dental tools in small to medium dimensions	Surgical implants: large dimensions, small batches  Dental implants, smaller quantities  Medical technology in general	Surgical implants: smaller dimensions/geometry  Dental implants
Special features	Patented gap system, absolute process repeatability, high efficiency batch processing, simple operation	Compact and small, processing and machine quality same as Series-CF, but in table-top format, simple operation	Advancement of CF technology, grinding and polishing without changing the container or media, simple operation  Water and compound input adjustable using the touch panel -> high process reliability

## CENTRIFUGAL DISC FINISHING MACHINES OF SERIES CF, CF-T, CF-SP

### Equipment

- ▶ Process containers with hot molded PU lining
- ▶ High-quality gap system with ceramic rings for using extra-fine polishing granulate
- ▶ Aluminium profile frame - easy to add on optional equipment
- ▶ Speed control via frequency inverter
- ▶ Digital readout of preset time, elapsed time, speed and faults (CF-T only)
- ▶ PLC touch screen control unit with digital display of processing time, speed, rinse cycle, dosing, and other important process parameters; storage for up to 75 different processing programs. (not for CF-T)
- ▶ Automatic completion of grinding and polishing process thanks to flexible programming of the water flow and the compound concentration during the process (only for CF-SP).

### Options and accessories

- ▶ Dosing unit for the automatic preparation of the water/compound mixture or dosing pump with suction nozzle and automatic cut-out when empty (CF-T)
- ▶ Automatic rinsing unit. Pre-selection of the compound concentration using the control system. Display of water flow on the control system. (CF, CF-SP)
- ▶ Drawer system for the storage of additional media containers (CF, CF-SP)
- ▶ Manual separator unit using a manual screen (CF, CF-SP)
- ▶ Spray system prevents the workpieces from coming to rest on the rim of the container and not being processed. (CF, CF-SP)
- ▶ Automatic separator unit using screening machine with vibration motor

Extensive machine and accessory information under [www.otec-online.com](http://www.otec-online.com) or further options on request.



# AN OVERVIEW OF THE MACHINES

DF series „dry/wet“	
Areas of application	Endoscopy Femurs Orthodontic and dental tools Surgical implants such as tibias, hip joint, heart valves, etc.
Special features	The angled holders produce optimal surfaces even for complex geometries

## DRAG-FINISHING MACHINES DF DRY/WET

### Equipment

- ▶ Process container DF 3/4 150 litres fill volume, DF 5/6 220 litres, DF 8/10 300 litres
- ▶ Inside of process container PU-coated for minimal wear (only DF wet)
- ▶ Stable main frame of aluminum profile
- ▶ High-value and airtight steel cladding, painted on the outer walls and floor
- ▶ Quick change of the process container
- ▶ Vertical spindle with ball screw drive for 100 % duty cycle
- ▶ Display and pre-selection of the vertical work piece position
- ▶ Storage of 200 programs
- ▶ Greater clearance between the top edge of the container and the holder, for easier loading of holder
- ▶ 3, 4, 5, 6, 8 or 10 clamping devices for holding work piece holders
- ▶ Reinforced bearing for holder weights up to 15 kg
- ▶ Backup of the programs on external MMC card

### Options and accessories

#### Immersion depth control

- ▶ For the control of the immersion depth of the work pieces in the grinding/polishing media
- ▶ Dosing unit (only DF wet) for the automatic preparation of the water/compound mixture with automatic rinsing unit. Pre-selection of the compound concentration using the control system. Display of water flow on the control system.

#### Holder with independent rotation

These holders were especially developed for tool processing, every work piece rotates independently during processing. This achieves an even processing quality in a significantly shorter process time.

#### Angled holders

Especially suited for the processing of face surfaces (e.g. for tibias).

#### Additional drive

Thereby work piece and rotor speed can be adjusted independently of each other and achieve optimal grinding and polishing results.

#### Water cooling

- ▶ For the reduction of granulate temperature
- ▶ Especially suited during the usage of polishing granulates

# AN OVERVIEW OF THE MACHINES

HV		ECO-Maxi
Areas of application	Surgical implants: large dimensions	Rapid Shell Modelling: Small batches/laboratories
Special features	Very gentle processing	Cost-efficient versatile tool for small series with very short processing times, simple operation

## VIBRATOR HV 20

### Equipment

- ▶ Process containers with PU lining
- ▶ Speed control via frequency inverter
- ▶ Container volume 23 litres
- ▶ Digital display of speed and process duration
- ▶ Automatic reversal of the direction of rotation

### Options

- ▶ Dosing pump
- ▶ Separation sheets which transform the main process chambers into smaller chambers for single processing

## CENTRIFUGAL DISC FINISHING MACHINE ECO-MAXI

### Equipment

- ▶ LCD display of speed and process duration
- ▶ Speed control via frequency inverter
- ▶ Bayonet fitting for container attachment
- ▶ Automatic container detection and thereby speed range adaptation
- ▶ Automatic change of the direction of rotation in the magnetic mode