PERFECT SURFACES WORLDWIDE

A WELCOME FROM THE TECHNOLOGY LEADER
in mass finishing

Proverbial ingenuity, coupled with German efficiency and a love of perfection, are the best qualifications for developing successful ways of creating immaculate surfaces. Driven by these attributes of German engineering, OTEC, with its innovative technologies, has grown into the industry trendsetter in just a few years.

MARKETS

AUTOMOBILINDUSTRIE

TOOLMAKING INDUSTRY

STAMPED, TURNED AND MILLED PARTS

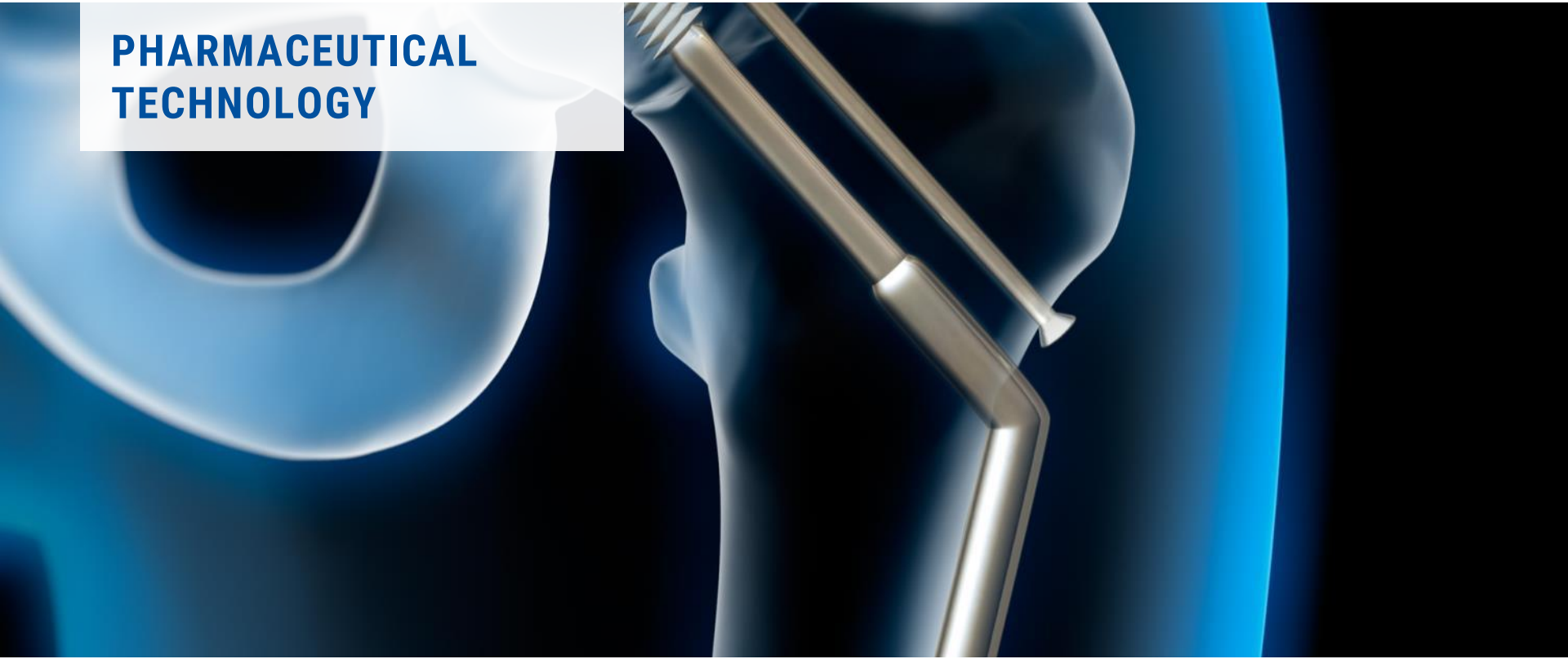
AEROSPACE INDUSTRY

MEDICAL AND PHARMACEUTICAL INDUSTRY

CERAMIC AND PLASTIC PARTS

JEWELLERY AND WATCHMAKING INDUSTRY

PHARMACEUTICAL TECHNOLOGY



PHARMACEUTICAL TECHNOLOGY
TABLET PUNCHES AND DIES

- Special process parameters for pharmaceutical technology:
  - Fast and economical surface treatment
  - Constantly high quality in no time
  - Workpieces with different shape and weight
  - Reduction of tool costs
- Precise smoothing and polishing
- Special features of the OTEC process:
  - Process reliability
  - Individually applicable know-how

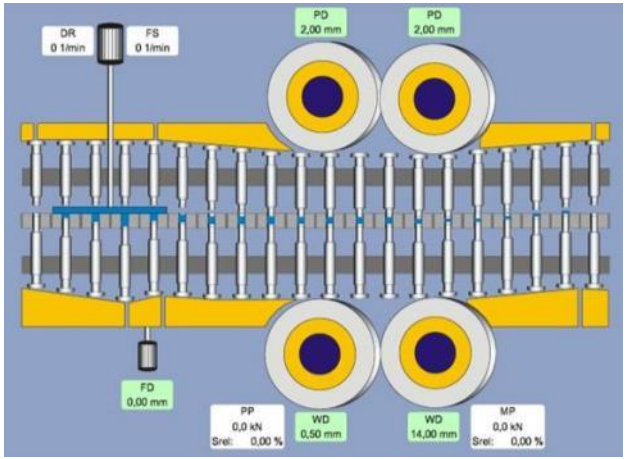
FIELDS OF APPLICATIONS PHARMACEUTICAL TECHNOLOGY

TABLET PUNCHES AND DIES

Manufacturing process and pressing process

- In the manufacturing process of tablets, changes occur on the surfaces of the tools due to the pressing process
  - Increase in roughness depending on the tablet materials used
  - Increase adhesion of the tablets to the press

- Pressing
  - Production of several hundred thousand tablets per hour on rotary presses
  - Tablet punch travels its set path with the necessary KN pressing force
  - As quality control is only possible indirectly, process safety is very important
  - The punches together with the die form the press chamber
  - During the compression process, the material to be pressed slides along the tool surfaces of the pressing surfaces



TABLET PUNCHES AND DIES

Manufacturing process and pressing process

- Task of the tabletting tools
  - Pressing high quality tablets
  - Weight, shape, burr-freeness and surface of the product "tablet"

- Smooth, polished surface of the product-contacting components enabled
  - Reduction of friction and thus resistance
  - Greater performance of the press is possible in many cases
  - Reduction of sticking of the tablet when ejected by the lower punch
  - Reduction of mechanical clawing in the tiny depressions of the pressing surface
  - Reduction of the hydrophobic lubricant added to the pressed product
    - Slightly hinders the dissolution process of the tablet after ingestion

TABLET PUNCHES AND DIES

Problems caused by manufacturing process

- The following problems
  - Adhesion or breaking apart of the tablets
    - Especially with profiled punches (notch, logo, brand or company name)
  - Lower process reliability & productivity
  - Poor flow behavior of the tablet material on the die surface due to rough surfaces
  - Longer press cycles
  - Shorten the life of punches and dies

- The pressing surface of used punches usually have significantly increased surface roughness compared to new punches. The deformations can be clearly seen by means of images under the reflected-light microscope.

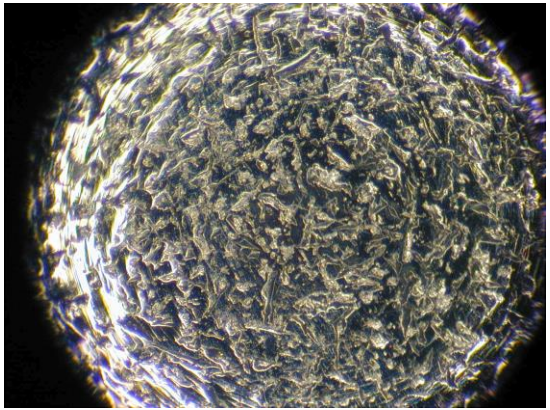
- Care and polishing of tabletting tools is necessary with regards to the surface finish
  - Surface roughness of the pressing surfaces
  - Adhesion of the tablets
  - Constant friction reduction during the pressing process

TABLET PUNCHES AND DIES

Conventional manual polishing process

- Manual polishing at manual workstations
  - Clamping in partially custom made fixtures or in chucks of a lathe
  - Machined with small driven tools such as brushes and felts using polishing pastes and muscle power

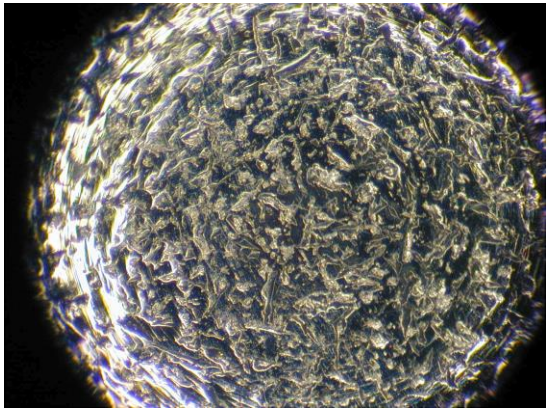
- Problems of manual polishing:
  - Very time consuming
  - Without uniform surface texture of all punches of a press
  - Depending on the shape and size of the pressing surface, up to 5 minutes preparation time per punch
    - Compared to an automatically running polish relatively large effort
    - Taking up a lot of labor time



TABLET PUNCHES AND DIES

Conventional manual polishing process

- Not possible in complex shapes, e.g. “Oblong” tools, eventually with double-sided engravings and / or dividing notches
  - Great differences in shape and surface quality within a set
- All parameters of this polishing process such as contact pressure, processing time, use of polishing paste depending on the skill of the polisher
- System stop and replacement or rework of individual punches necessary due to differences in manual polish
- Fluctuations in the pressing force



TABLETTING TOOLS

Machine polishing as a better alternative

- Solution
  - Development of a machine polishing process with process reliable results

  → Machinery from the market leader and inventor of the best process!

FINISHING MACHINES
for pharmaceutical technology

DRAG FINISHING MACHINES
STREAM FINISHING MACHINES

DRAG FINISHING MACHINES

DRAG FINISHING TECHNIQUE (DF)

Technique

- Workpieces are clamped in specially designed holders
  - Prevents collision of the workpieces
- These holders are dragged in a circular motion through a process drum containing grinding or polishing granulate
- This high-speed motion generates high contact pressure between the workpiece and the media, which in a very short time produces perfect results:
  - High-precision edge rounding
  - Smoothing
  - Mirror finish

DRAG FINISHING TECHNIQUE (DF)

Advantages

- Finishing of high-quality and damage-sensitive components is possible
- Absolute reliability
- Maximum cost-effectiveness
- Perfect finishing results
- Short processing times
- Realisation of multi-stage processes
  - Fine grinding and polishing
  - Quality equivalent to that obtained by manual polishing

DRAG FINISHING MACHINES SERIES DF PHARMA

Properties

- Stainless steel components and components with heavy duty paint
  - For surface treatment in the pharmaceutical and food industry
- Versions
  - Series DF 40 for processing of up to 36 work pieces
  - Series DF 80 for processing of up to 60 work pieces
- Application-specific work piece holders
  - Optimum fixing of the work pieces
  - Fast assembly
  - Easy batch change
- Thanks to the water cooling system of the process container constant low level of the temperature of the polishing granules
  - Extension life-time
  - Consistently high processing quality
- Advantages:
  - Absolutely reliable
  - High profitability
  - Perfect processing results
  - Short process times
  - From inventor of the process and technological the market leader

Video

TABLETTING TOOLS

OTEC machine polish

- Automatic polishing in OTEC Drag finishing machines DF

- Processing parameters:
  - Up to 120 punches in one operation
  - Process time 20-30 minutes
  - Polishing agent combination of polishing paste, granules made of plastic granules, e.g. pure polycarbonate
  - Polishing paste consists of alumina, glycerin and aerosil
  - Only substances or mixtures of substances are used in polishing, which have been used in pharmacy already for a long time

TABLETTING TOOLS

OTEC machine polish

- Process:
  - Rotating movement of the punches in the granule generates a relative movement between the media and the punch
  - Polishing of the surface
  - The geometry of the process container is designed in such a way that the polishing medium accelerates briefly but is immediately slowed down again
  - Continuous rotation of the parts during the polishing process
  - Uniform processing of all punches
  - The defined, angled arrangement of the tools makes the polishing of the pressing surfaces easy
  - This makes it possible to work up difficult press surfaces simply and efficiently

DRAG FINISHING MACHINE

Holders for tabletting tools

- Special holders to fix the tools in an angled position during processing
- Quick-release holder for punches
  - The mounting time is approx. 2 minutes per holder
  - A uniform polish of the pressing surface is ensured by a perfect inclination of the tools
  - Holders:

    Euro B: 12 work pieces / holders

    Euro D: 10 work pieces / holders
- Further work piece holders for dies etc. are available
- Custom made work pieces holders can be developed as required

DRAG FINISHING MACHINE

Optional equipment

- Water cooling
  - To reduce the granule temperature process container
- Trolley
  - To easily change the process container
- Special punch holders to angle them during processing
- Quick release holders for tablet press tools

STREAM FINISHING MACHINES

STREAM FINISHING TECHNIQUE (SF)

Technique

- Workpieces are clamped in a holder and immersed in the rotating process drum filled with grinding or polishing media
- Abrasive effect by relative motion between the workpiece and the process media
- Deburring, edge rounding and polishing in a single operation
- Very short finishing cycles
- Easy to automate
- High process reliability

STREAM FINISHING MACHINE SF-4

For tabletting tools

- Tabletting tools polished to perfection - in a fully automatic process
- First fully automatic stream finishing machine SF 4 for polishing tabletting tools
- Tool polish without manual clamping
- Very smooth pressing surface to reduce friction and therefore also resistance
  - Larger pressing capacity possible
  - Reduces sticking of the tablets
  - Smooth process of pressing
- Significant reduction of tooling costs for pharmaceutical companies

STREAM FINISHING MACHINE SF-4

For tabletting tools

- The process:
  - The tools are inserted on small pallets into the robot cell directly after cylindrical grinding
  - The robot is loading and unloading the SF machine automatically
- To finish the workpiece completely, it is rotated during the process once by the robot

TABLETTING TOOLS
OTEC advantages

- Automatic polishing with little manual effort
- Easy polishing of complex geometries
- Avoidance of damaging the punch
- Smoothing of the tool press surface and uniform polishing of all punches
- No additional corrosion protection required thanks to thin film of glycerin after the processing process
- Specification and reproducibility of the polishing process
- Removal of sticking product residues possible
- Polishing of the dies inside diameter > 6 mm possible

TABLETTING TOOLS
OTEC advantages

- No change in punch size
  - Just removes the tips of the roughness profile
- Prevention of factory-induced fluctuations of the polishing process by PLC control
  - Processing time, speed, cycles, paste dosing etc.
- No visible difference between the press surface of a new punch and a repolished punch
- Significant reduction in sticking of the tablets to the polished punches
  - Pressing machines with higher speed

FINISHING CENTRE

- Finishing of sample workpiece with no obligation and costs
  - Individual customer advice
  - Detailed documentation
  - Finishing concept tailored to your needs

FINISHING CENTRE

- State of the art measurement technology
- Very experienced and highly qualified staff members
- Process research together with institutes and universities

THANK YOU FOR YOUR ATTENTION.