



FELSS

The smarter way of forming.

MEDICAL TECHNOLOGY

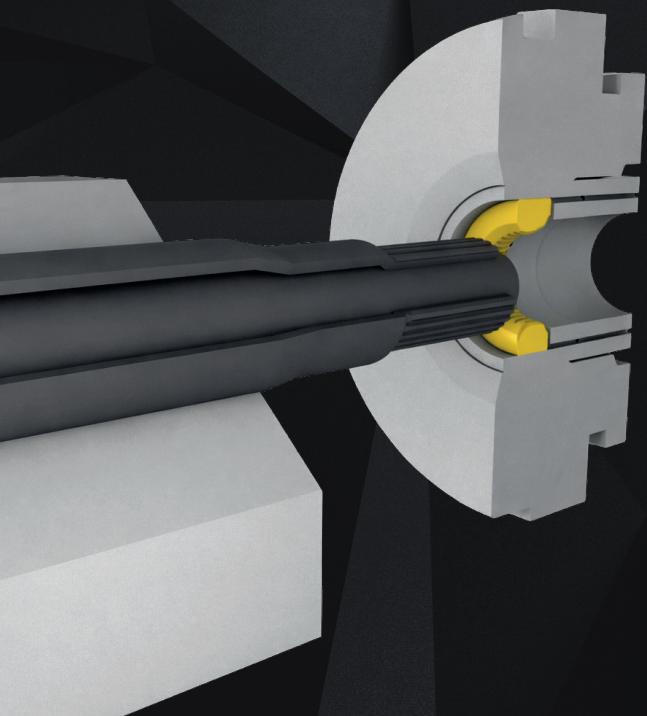
INDUSTRY EXPERTISE

REPEATABILITY IS THE NEW “PERFECT.”

THREE FORMING TECHNOLOGIES FOR SCALABLE MEDTECH COMPONENTS.

In series production for medical technology, components often become cost drivers not because of their design, but because manufacturing requires dimensions to be maintained consistently, surfaces to meet high standards and additional finishing steps to be avoided wherever possible. Every extra process step increases effort, risk and cost.

This is precisely where our non-cutting forming technologies make the difference: they enable extremely tight tolerances, high surface quality and cold work hardening directly in the formed zone. The result is precise component manufacturing and stable, efficient process chains.



AXIAL FORMING

PRECISE PROFILES IN A SINGLE PROCESS STEP.

Application

Targeted forming along the component axis to modify the cross section.

Result

- very high repeatability
- short cycle times
- increased strength through cold work hardening

Best suited when ...

... geometry and mechanical properties need to be controlled along the length of the component.

ROTARY SWAGING

WHEN SURFACE QUALITY, TIGHT TOLERANCES AND MATERIAL UTILISATION ALL MATTER.

Application

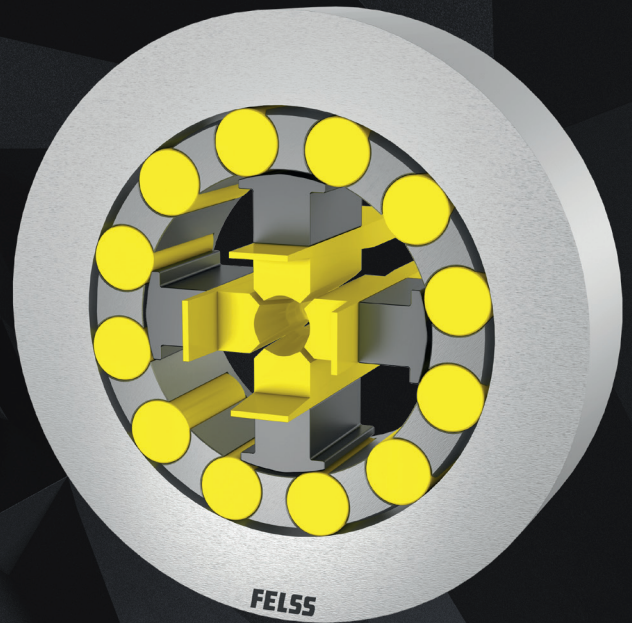
Forming components with radially acting tools directly to final contour.

Result

- very tight tolerances (process-dependent, from $< \pm 0.01$ mm to ± 0.05 mm)
- surfaces up to $Ra\ 0.1\ \mu\text{m}$
- non-cutting, no material loss; cold work hardening increases tensile and yield strength

Best suited when ...

geometry and mechanical properties need to be controlled along the component.



ROLLING

FINE GEOMETRIES, STABLE IN THE PROCESS.

Application

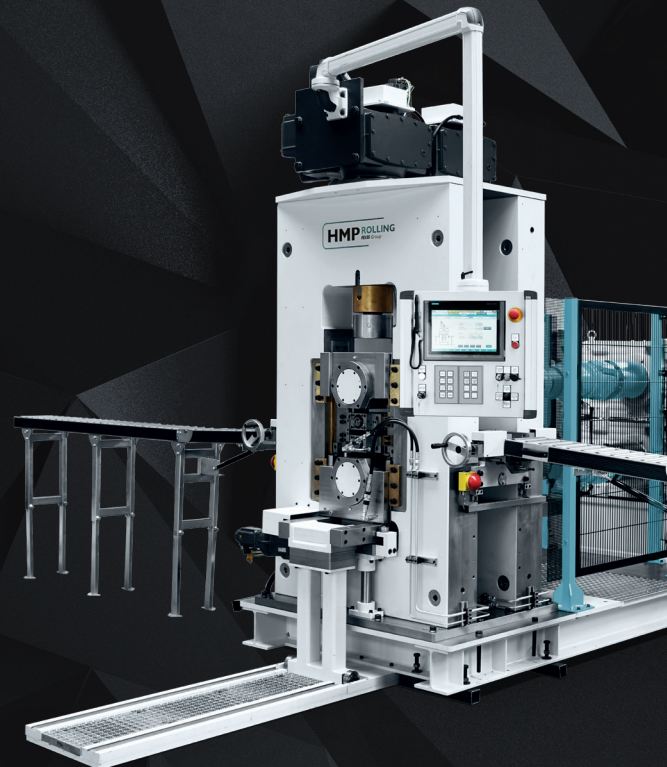
Forming with rotating tools to reduce or profile a crosssection.

Result

- very precise geometries
- cost-effective profiling without cutting
- stable component properties through forming

Best suited when ...

... cross-sections need to be adjusted or profiles introduced without additional cutting steps.





TYPICAL APPLICATIONS & COMPONENT CHARACTERISTICS

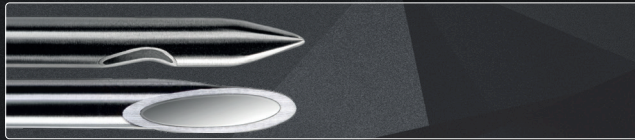
In medical technology, geometry, material properties and tolerances determine function and service life. Our forming processes are used wherever rotationally symmetric components – whether thin-walled or solid – need to be manufactured precisely and reproducibly.

The following examples illustrate typical component classes and the key technical requirements in each case – from dimensional accuracy and local work hardening to structural optimisation.

SMALL COMPONENTS, **HIGH DEMANDS.**

THIN-WALLED & GEOMETRICALLY DEMANDING COMPONENTS

As wall thickness decreases, the demands on process control and precision increase. Even under these conditions, our forming technologies enable stable geometries & clearly defined transition areas.



ANAESTHESIA CANNULA | INJECTION NEEDLE

Needle tip forming prior to grinding

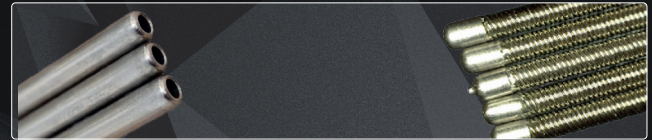
- + closure without additional material possible
- + thin-walled components can be processed



ENDOSCOPE

Forming the tip radius of the endoscope by rotary swaging

- + suitable for thin-walled components
- + prepares the tip for the subsequent grinding process



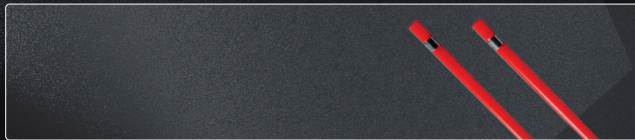
CATHETER | CANNULA

Rotary swaging for thin-walled components

- + even wall thicknesses
- + high surface quality

FUNCTIONAL AREAS & TARGETED WORK HARDENING

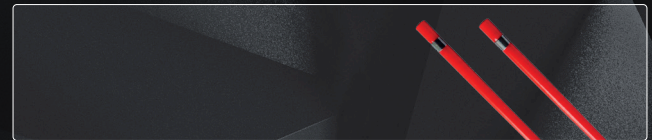
For certain components, the focus is not on the entire geometry, but on a clearly defined area. Targeted forming makes it possible to locally influence material properties and reproducibly define functional zones.



ELECTRODE FOR CARDIAC CATHETERS

Attaching the sleeve to the catheter tube

- + tight tolerances achievable
- + cost-effective process



ANEURYSM CLIPS

Rotary swaging of the necked section

- + local hardening in the necked section
- + improved bending behaviour through hardening



STRUCTURAL & LOAD-BEARING COMPONENTS

For structurally loaded components, wall thickness distribution, rigidity and material utilisation are key. Cold forming processes enable functional geometries and cost-effective manufacturing without unnecessary machining.



INTRAMEDULLARY NAILS | IMPLANTS

Axial forming and roller burnishing of longitudinal profiles

- + targeted wall thickness transitions
- + increased strength and rigidity
- + low component weight



DENTAL CHAIR SUPPORT ROD

Forming in the functional area

- + good surface finish
- + hardening in the formed area



MEDICAL INSTRUMENTS

Rotary swaging of tube and solid material

- + targeted hardening in the functional area
- + good surface quality

THE FELSS GROUP

The Felss corporate group, founded in 1905, is a provider of solutions in the field of cold forming of tubes and solid materials and a specialist for the automobile industry. Since the integration of the HMP companies purchased in May 2019, Felss now also serves numerous customers in other sectors. Among these are customers from industry, aerospace, medicine and precision mechanics.

As lightweight construction experts, we develop optimal processes, machines or also the finished product in component manufacturing for our customers. Around 700 employees work worldwide at our seven locations in Germany, the USA, China and Slovakia.



USA

Component manufacturing
New Berlin // WI



DEUTSCHLAND

Machine building
Königbach-Stein
Pforzheim
Nesselwang

Component manufacturing
Bretten-Gölshausen



CHINA

Machine building
Kunshan

Component manufacturing
Kunshan

SLOWAKEI

Component manufacturing
Ilava

MAKE: FELSS SYSTEMS. MECHANICAL ENGINEERING

As experts in lightweight design, we realize optimal solutions and processes for our customers' individual machines, production systems, and process chains. Furthermore, we support customers at all times - be it with maintenance and training measures, with the providing of new tools, and with the possibility to further develop and expand upon systems on request.

BUY: FELSS ROTAFORM. COMPONENT MANUFACTURING

The Felss Group offers component manufacturing extending from prototypes to large series. In the process, we concentrate not only on our core technologies, but instead also offer a broad range of services for ready-to-install components through additional in-house technologies.

SINCE
1905

FELSS GROUP GMBH

Dieselstrasse 2
D-75203 Koenigsbach-Stein
T +49 7232 402-0
F +49 7232 402-122
info@felss.com

www.felss.com

