

## Added value by sophisticated technologies:

Our thermal processing and production capabilities enable significant improvement of component service time and functionality as well as productivity of manufacturing processes. Listemann know-how gives you access to state-of-the-art technologies and equipment without own investments.



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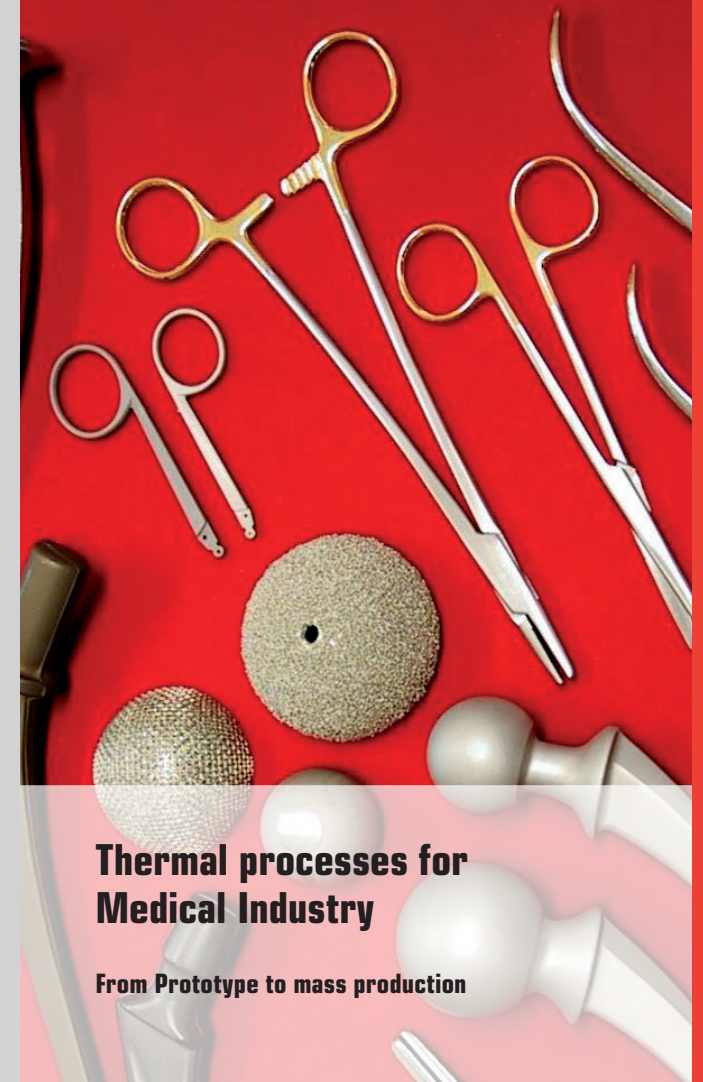
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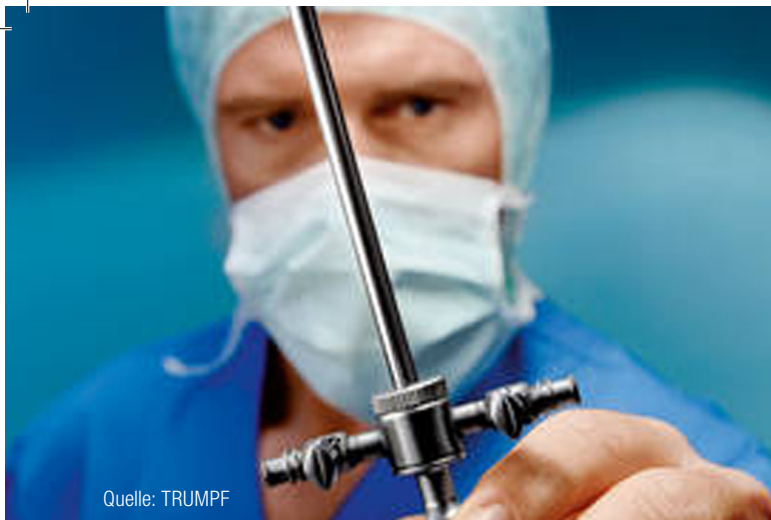


**Thermal processes for  
Medical Industry**

**From Prototype to mass production**

Medical Industry





Quelle: TRUMPF

**Listemann AG offers customers in medical industry a wide range of sophisticated services. Be it implants, surgery instruments or tooling our experience in processing high-end materials like titanium and cobalt based alloys guarantee product output to quality standards of major players in medical industry.**

**... Titanium, 17-4 PH, 1.4542, 1.4057, 1.4021, M390 ...**

## Quality

### Experience

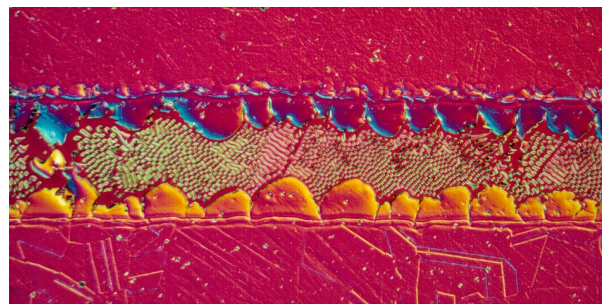
For more than two decades we have been serving business areas such as the aircraft and aerospace industry, the medical industry, power generation, the automotive industry, toolmakers and general engineering industry and gained knowledge in metal treatments of almost all steel and iron cast alloys, titanium and its alloys, cobalt and nickel based as well as copper and its alloys.

### Traceability

Heat treatment processes are very sensitive in terms of traceability and record keeping. Mistreatments cannot be seen by eye or being measured by using a micrometer or other measuring devices. They only can be detected by destroying either a part or a test sample. At Listemann we run a central system that takes records of furnace and load thermocouples, vacuum levels and gas pressures, which enables us to prove your parts being treated to your specification. In our laboratory we are able to perform metallographic inspections and hardness testing on sample parts if required.

### Certifications

AS/EN 9100 (based on ISO 9001), NADCAP heat treatment/brazing (based on AMS 2750D), NADCAP welding, NADCAP coatings, Major OEM approvals



## Processes

### Heat Treatment

VACUUM HARDENING AND ANNEALING: oxidation-free heat treatment process, low distortion and environmentally friendly.

PROTECTIVE GAS ATMOSPHERE ANNEALING: oxidation-free heat treatment, cost effective.

AIR ANNEALING: oxidising heat treatment process, very cost effective.

### Brazing

HIGH TEMPERATURE BRAZING: joins different materials like steel, titanium, hard metal, ceramics or diamonds i.e. of abrasives, tubes for endo-scopes or helium leak-tight components for bio process technology and analysis

### EBW - Electron Beam Welding

Under vacuum: enables oxidation free welding of next to all metals and its combinations including titanium and cobalt base alloys at very low distortion.

### Sintering/MIM

Sintering of metal injection moulded parts for surgery instruments.



## Equipment

### Vacuum Furnaces

More than ten state-of-the-art vacuum furnaces with loading capacities between 0.04 to 3.20 m<sup>3</sup> are in use at Listemann AG for operation with nitrogen and argon up to a pressure of 6 bar.

### Protective Gas Atmosphere Furnaces

Several protective gas atmosphere furnaces in which nitrogen and hydrogen gases can be processed for heat treating and brazing as well as ammonia for nitriding and nitrocarburizing operations.

### Air Atmosphere Furnaces

Two furnaces with loading capacities of 0.12 and 6.30m<sup>3</sup> are in use at Listemann.

### Maintenance

All our equipment is pro-actively maintained to the highest standards of industry well as leak tests are being performed on pre-defined regular bases to ensure equipment failures are kept to a minimum.

### Furnace Classification

Based on specification AMS 2750D the certified vacuum furnaces at Listemann AG are class 3 furnaces (+/- 8°C) with class B instrumentation.

