

**Ipsen. We deliver performance.**

Hard work wins



# We didn't discover hardening.

Legend has it that a Syrian king once wanted to punish a criminal in particularly gruesome manner. He ordered that he be impaled upon a red-hot sword. To the astonishment of the executioner, the blade proved to be harder and more flexible afterwards. What can we learn from history? Even before this modern technological age, our predecessors – particularly the more experimentally minded swordsmiths – discovered that through heating and quenching the hardness of steel can be markedly increased. This is called hardening.

A cast iron pan which falls on to a stone floor, shatters – because cast iron is not only hard, it is also brittle. By contrast, a steel pan will, in most cases, survive its fall without problem. This is because steel is elastic, i.e. softer and more ductile than cast iron. The aim of hardening is to confer cast iron hardness on steel without any loss in elasticity.

However both elasticity and ductility are immediately sacrificed when hardening is carried out. By carrying out so-called tempering, i.e. re-heating the hardened steel, the elasticity and ductility are partially regained. Moreover, from the ‘annealing and tempering colours’ which the steel takes on during heat treatment, blacksmiths have long known the correct temperatures for this process.

The hardening of steel is therefore a well established technique which has always required the experience, knowledge, and sensitivity of a master craftsman. Today, computer controlled industrial furnaces are used in the process and Ipsen is the world's number one when it comes to the manufacture of such systems.

1.250 °C –  
Hardening temperature  
for high speed steels

1.050 °C –  
Hardening temperature  
for tool steels and  
stainless steels

850 °C –  
Hardening temperature  
for tempered steels,  
case-hardened steels  
and bearing steels

550 °C –  
Tempering temperature

450 °C –  
Tempering temperature

350 °C –  
Tempering temperature



# The entire heat treatment range.

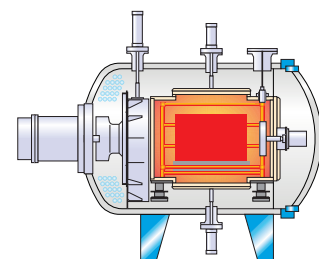
Ipsen covers the whole heat treatment range. In doing so, there are two Ipsen furnace types which are, more than any others, used in industrial heat treatment: atmosphere and vacuum furnaces.

When heat treating large workpiece batches, Ipsen Atmosphere furnaces are used. Carburisation, carbon nitriding, bright hardening and carbon-free bright annealing take place in an atmosphere in which the carbon content is regulated. All tempering processes are controlled using the Ipsen Carbon Sensor® and computer-based measurement and control system.

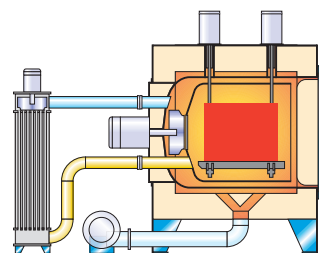
By contrast, heat treatment of high alloy steels with lower batch numbers is carried out in Ipsen vacuum furnaces. The transformation of the material grain under vacuum as well as the subsequent quenching in pure nitrogen guarantees a bright workpiece surface. Moulds and dies, precision aerospace parts, medical technology parts and corrosion-resistant stainless steels are amongst the parts most frequently treated in vacuum furnaces.

In this field, the Turbo® Treater® is the latest development from Ipsen. It stands out thanks to its highest possible efficiency, the uniform treatment achieved and the minimal use of resources.

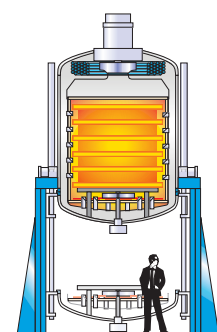
Using AutoMag® production software, furnaces, washing machines, transport, loading and unloading equipment are chained together in a fully automatic, open system which can operate as a quasi-continuous system and thus can be optimally integrated into every manufacturing flow.



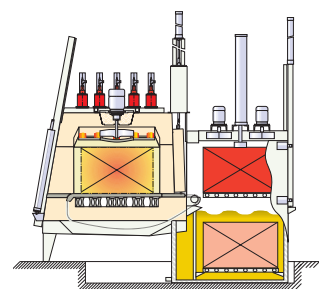
The Turbo® Treater – vacuum furnace with high quench speed and uniform cooling.



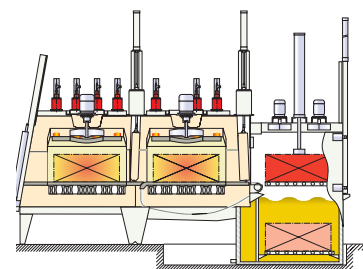
Multi Treater – evacuable retort furnace with suspended batch table for a charge up to 5 tons for inert gas heat treatments.



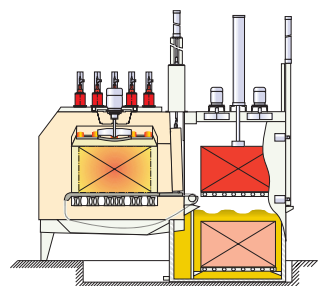
VR/VRK – universal vertical vacuum over with radial and vertical cooling gas circulation.



TQ – gas-tight atmosphere furnace with heating chamber and integral double-walled oil quench bath.



TQ-2 – atmosphere furnace with gas-tight heating chamber and integral double-walled oil quench bath.



RTQ – atmosphere furnace with gas-tight heating chamber and integral double-walled oil quench bath.





# New technologies for new steels.

Ipsen's heat treatment systems represent the optimum solution for today's commonly used materials and technologies. Nevertheless, when it comes to improving steel properties, furnace technology is not the only important factor. It also depends on the use of special processes and their precise control. Here once more, Ipsen is a pioneer in the field.

The innovative SolNit® process ensures that steel which must not only be hard but also exceptionally corrosion-resistant, can for the first time be hardened using solution nitriding. The result is steels which are acid-resistant and are suitable for use both in medical and food processing applications. The same process can also be used in the manufacture of particularly erosion-resistant steels, as are required in turbine and pump manufacturing. Further proven processes such as SuperCarb® for atmospheric carburisation or AvaC® for low pressure carburisation have been established industry standards for many years.

Ipsen has also achieved much in the further development of process control. The latest examples are Carb-o-Prof® 4.0 and Vacu-Prof® 4.0, process software solutions, which make furnace control simpler, more reliable, and set new standards in ease of use and process reliability.

Never one to stand still, Ipsen continues to make new developments. In close cooperation with customers, technical colleges and universities, Ipsen continues to drive the advancement of new technologies. Our goal is to provide new steel qualities and improvements in production efficiency.



Gearwheel  
for a wind turbine



Precision part  
for a ship's diesel engine



Aircraft engine  
turbine blade



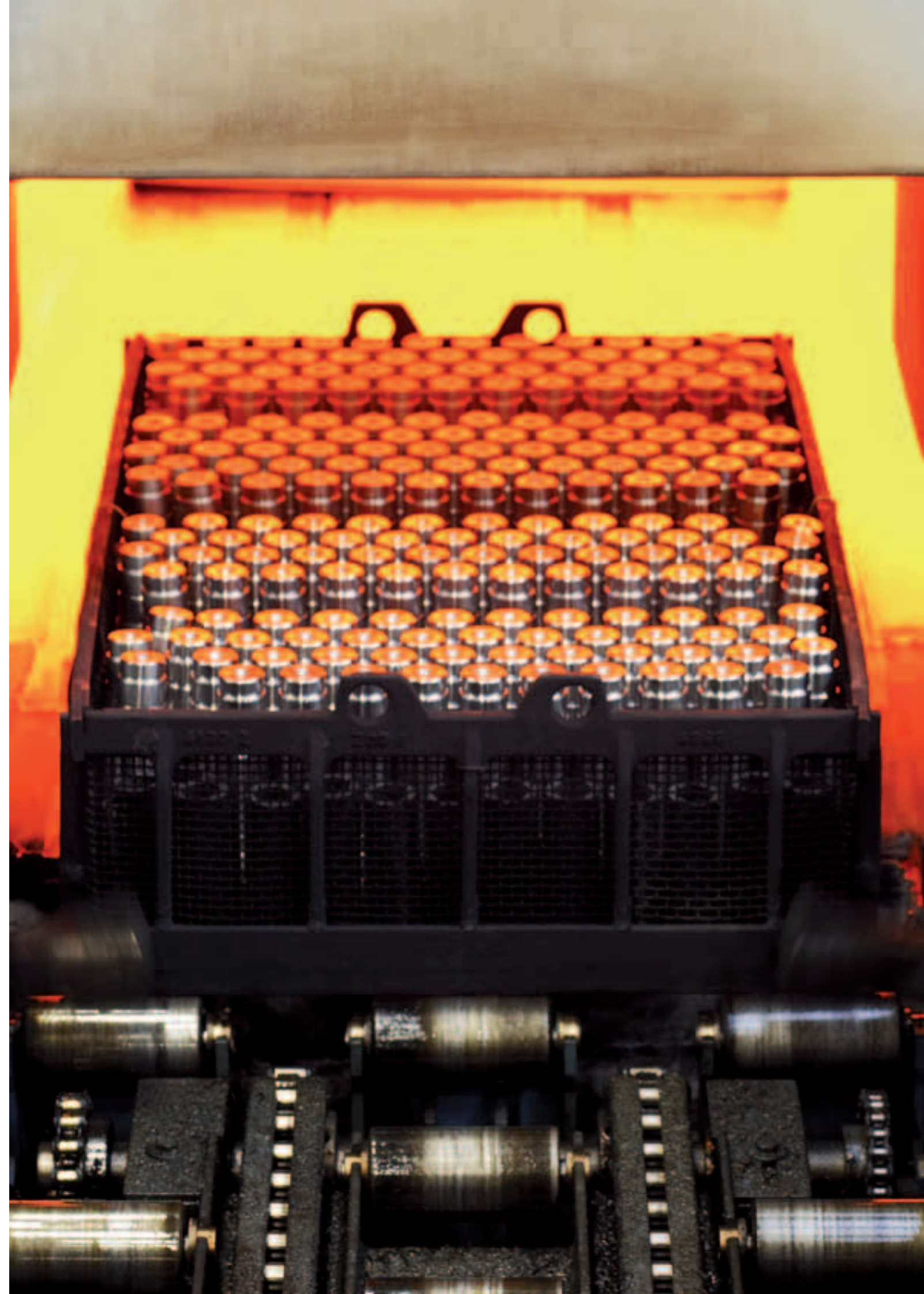
Spiral conveyor for a food  
industry process machine



Gear wheel  
for an automotive gearbox



Cam shaft





# About us.

Ipsen – we deliver performance.

Ipsen stands for cutting edge heat treatment technology and systems. Few other enterprises in the world have had such a decisive impact on the development of heat treatment.

For more than 60 years Ipsen has been providing innovative technologies and methods with which to give new properties to steel. Ipsen's products combine the highest performance with outstanding reliability, which perhaps explains why our furnaces and heat treatment equipment enjoy an excellent reputation all over the world.

The company has production sites in Europe, America and Asia. This, together with representatives in 34 countries, ensures excellent customer care all around the world.

Despite the company's many important innovations, Ipsen's focus is not solely on technology: in all we do, we aim to surpass our customers' expectations.

We are not only committed to building and developing great technology. We are also passionate about providing swift, seamless, attentive service.

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