

More efficiency ...
... what's up next?

ADVANCED EFFICIENCY

Heat treatment is energy-hungry. Ipsen has been a leader in facing this challenge for years, providing innovative, ever more efficient heat treatment solutions. Nonetheless, as they say, "standing still means falling behind" and Ipsen is now offering a broad spectrum of new improvements in equipment, processes and control systems.

Hard work wins



There is an abundance of energy. We're learning to use it better.

The sun offers us 10,000 times more energy that we use today, but only a tiny fraction of it is useable. Fossil fuels are not only the focus of public criticism, they are also getting more expensive.

In short, if you want to perform heat treatment economically, you have to be looking for optimum efficiency. We call it: **ADVANCED EFFICIENCY**.

■ As incredible as it sounds, almost 40 % of the energy used in German industry goes to running industrial furnaces. This is an alarming appetite for energy – especially for your bottom line – costing industry around 30 thousand million euros a year. Given rapidly rising global energy demand, it is safe to assume that price increases will continue and even accelerate.

■ Heat treatment facilities' enormous energy consumption is a ticking time-bomb, and not just because of the environmental and fiscal implications. The new European Union EuP (Energy using Products) Directive is on its way to approval and adoption. Its requirements will soon have to be fulfilled alongside those of the existing EU Eco-Design Directive, 2005/32, and will place even more stringent limitations on energy consumption in heat treatment facilities.

2

Talk to the experts.

The right Ipsen technologies in the right places can help save energy and money. From initial conception to final installation, we'll be glad to advise you on how to get the most of your equipment's energy savings potential. You can rely on us. Our years of experience are on your side.

1

New is more efficient.

Ipsen furnaces are very long-lived, but older furnaces can cost a lot to run – more than you need to be paying. New equipment can run up to 30 % more efficiently. We'll be happy to show you how quickly an investment in a new furnace can pay itself off.

3

Details, details.

Making continuous incremental improvements can help you more – right now – than waiting to make the next giant leap. That's why we are constantly working on improving every detail of our furnaces and equipment, making them as energy efficient as we can.

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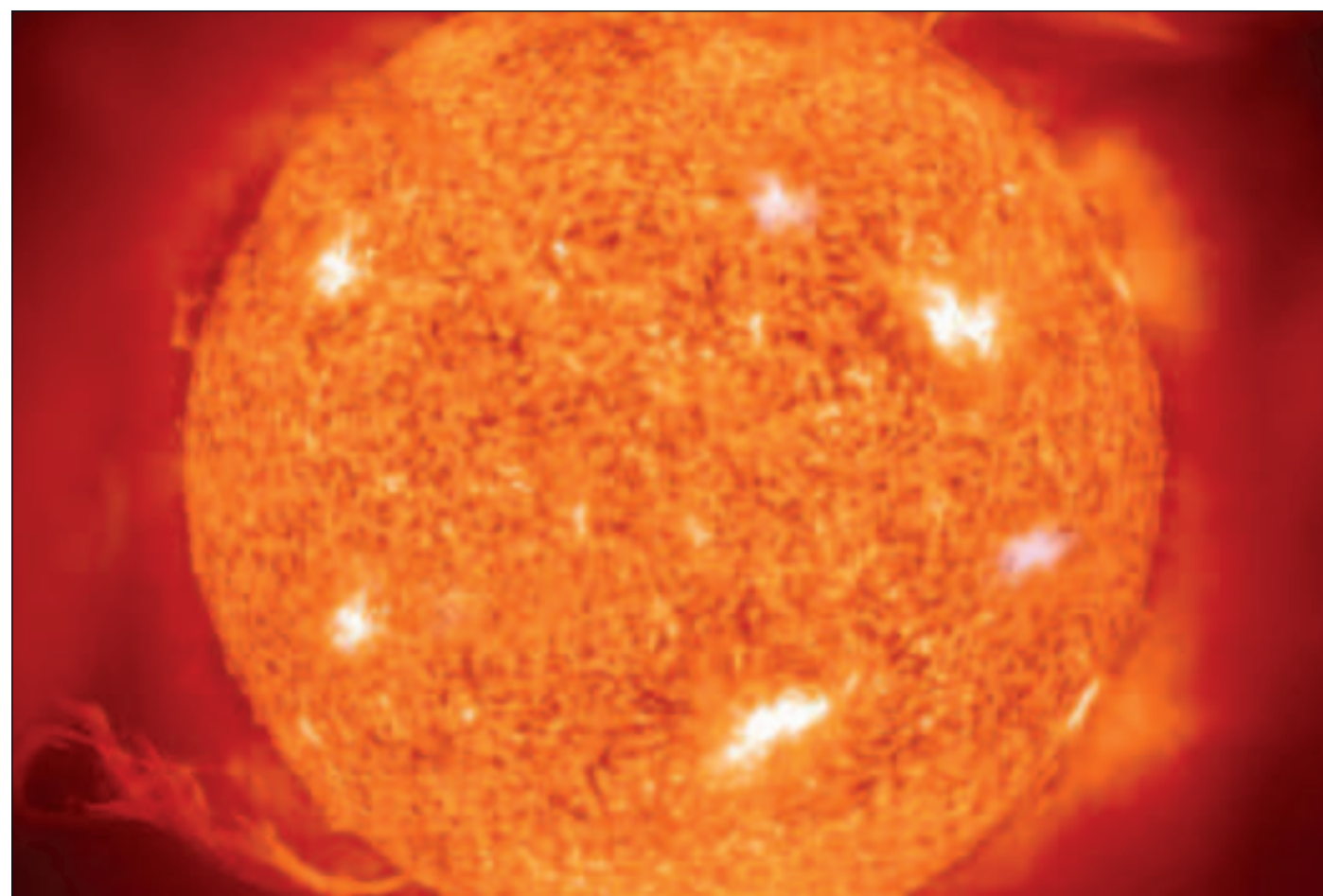
Usable volume makes the difference.

The decisive factor for the energy efficiency of vacuum- and atmospheric furnaces is the ratio of furnace volume to batch volume. Every increase in this "useable volume" ratio means increased productivity and reduced energy consumption per kilogram of material treated. The new Ipsen furnaces are built with optimal productivity and efficiency in mind.

4

Modernisation helps savings.

It isn't always necessary to buy new equipment. Complete- or targeted partial-modernisation of existing equipment can often help improve energy efficiency. Great improvements can be achieved by rebuilding or expanding your existing equipment with state-of-the-art process management and control systems.



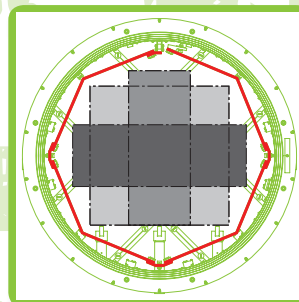
■ We at Ipsen have always closely followed these political and economic developments and are constantly striving to optimise the efficiency of our furnaces and equipment. Now, under the banner of our **ADVANCED EFFICIENCY** programme, we are putting our furnaces on a diet, reducing their energy consumption. The latest result of these efforts is the **HybridCarb** process. **HybridCarb** redefines gas carburizing, reducing the consumption of process gasses by up to 90 %, significantly sinking energy consumption and the cost of process gas production.

We have to be cleverer than Mother Nature. We don't have as much time as she.

Dynamic markets call for dynamic reactions. We have focused years of research and development on high energy efficiency and we have plenty of ideas on improving it for you. Sometimes the solutions can be astonishingly simple, like our new Titan 6 vacuum furnace.

■ To reduce energy consumption, optimal heat treatment processes are necessary. Improvements in process control can help keep the overall cycle-time – comprising heating, soaking and cooling phases – to a minimum. In the Titan 6, the optimization of the cycle time is realized by the VacuProf® control software. The potential for energy savings in this area is limited, however, to some extent by fixed process data required for optimal results.

■ For this reason, Ipsen's research and development department turned its attention to another process factor that offers more room for improvement: cooling gas consumption. The fundamental assumption is that minimising the use of cooling gas would significantly reduce its energy consumption. Therefore, the usable volume ratio of a furnace is decisive. This is the ratio of furnace volume to batch volume; the smaller it is, the less cooling gas the furnace uses, the more energy efficient the furnace's operation. The Titan 6 is the best furnace on the market in this regard. Conventional furnaces have a usable volume ratio of approximately 18. The Titan 6, on the other hand, a mere 6.8, making the Titan 6 2.6 times more energy efficient than a comparable conventional furnace.



Titan 6 – Squaring the circle in energy efficiency.

The energy savings in the Titan 6 are made possible by its innovative octagonal heating chamber with a 2,700 kg batch capacity. This increase in payload size combined with the furnace's overall energy savings, means more material can be treated per hour using fewer kWh per kilogram of heat treated material and substantial savings for you.



VacuProf® – More intelligence for more energy efficiency.

The intelligent VacuProf® control software reduces process gas consumption and increases productivity – awhile remaining very simple to operate.



LCP Start – Energy saving from the get-go.

Using Ipsen's Low-Current-Power-Start, electrical consumption in the peak load range can be drastically reduced from 10 times of the nominal vacuum current to roughly 2.5 times of the nominal current. This technology significantly improves the environmental impact of a vacuum furnace like the Turbo® Treater. Result: improved quenching and up to 70 % electrical savings.

Switch to efficiency with Cosinus-Phi-Switching.

The optionally available Cosinus-Phi-Switching for vacuum furnaces reduces idle current. Special circuitry in the transformers increases power efficiency during the soaking phase so greatly that the consumption of electricity in the soaking phase of the heat treatment cycle phase can be reduced by up to 40 %.



Vacuum pumps – Save energy with pressure.

The use of low-power pumps and optimised pump control systems improves energy efficiency. That's why Ipsen uses frequency-controlled pumps, intelligent pump cut-off systems and temperature-controlled diffusion pumps.



Nature's High-Tech.

Shark scales are finely channeled to inhibit cross-flow across their bodies, allowing them to swim faster while expending less energy.

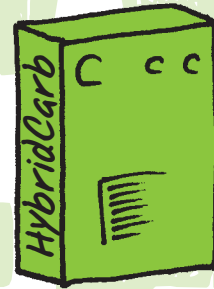
Scarcity does not mean going without. Now you can do more with less.

Nature shows us the way: the most nutrient-poor regions of the Earth, like tropical rain forests or coral reefs, produce the most diverse varieties of life.

That is the inspiration behind our revolutionary HybridCarb 2 gas carburizing technology: Refined recirculation processes to provide extremely efficient resource usage.

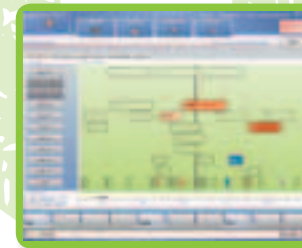
■ With conventional endo gas or nitrogen/methanol gassing processes only 2 % of the process gas is effectively used. The rest is burned off and released into the atmosphere. This is not only environmentally dubious, it is also an incredible waste of resources. That was exactly the idea that drove the development of our new process gas recovery process, **HybridCarb 2**. Furnace efficiency is enormously improved by reusing the process gas instead of wasting it. It isn't just good for our climate, it saves a lot of energy, too.

■ Since **HybridCarb 2** has been developed as an add-on kit, it can give significantly improved efficiency to almost any furnace, not just Ipsen models. Almost any atmospheric furnace can be quickly and easily retrofitted with a **HybridCarb 2** recycling kit by our service personnel in a few hours.



-90%

■ Improving the ecological equation: up to 90 % less CO₂ emissions. Using **HybridCarb 2**, an average furnace's emissions can be reduced by 58 tonnes a year. That's equivalent to the annual emissions of 38 VW Golfs driving 15,000 kilometres each.



AutoMag® 4.0 – the efficiency update.

The AutoMag® 4.0 automation software package combines simple operation with even more efficient use of energy and resources. Integrated planning tools can help significantly improve capacity utilisation in your facility and increase production efficiency.



PLC – Savings through intelligent control.

Intelligent control of each individual Recon®-Burner with the help of PLC assures your technical requirements will be met using the minimum amount of energy possible.

Supercarb® – Programmed efficiency.

The Supercarb® direct gassing process uses a fuel-air mixture at temperatures above 850 °C. The furnace is supplied with a mixture of fuel, such as natural gas, mixed with air – without the need for a gas generator. The Supercarb® process is characterised by its fast, uniform, consistent and reproducible carbon transfer as well as a high degree of energy efficiency.

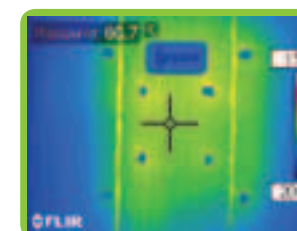
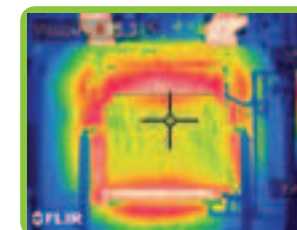
Ipsen Recon®-Burners reuse exhaust heat.

For energy efficient gas heating, Ipsen Recon®-Burners are constructed with special ceramic inner tubing. This material improves thermal efficiency from 50 % to 85 % by capturing and reusing heat from furnace exhaust gases.



Optimal Insulation.

A major factor contributing to the high energy efficiency of Ipsen furnaces is the optimal thermal insulation of their heating chambers provided by a combination of various high-tech insulating materials. The illustration on the left demonstrates the difference between the insulation of a conventional furnace (above) and a modern Ipsen atmospheric furnace (below).



■ **HybridCarb 2 – The universal recycling kit.** Almost any atmospheric furnace can be quickly and easily retrofitted with a **HybridCarb 2** recycling kit by our service personnel in a few hours.



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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Hard work wins

