

PRESS RELEASE

## **High energy costs: why energy efficiency in thermoforming is more important now than ever before**

Heilbronn, 01.09.2023 – With industrial energy prices high and volatile, environmental regulations are becoming more rigorous. Optimizing the energy efficiency of ILLIG's thermoforming solutions is therefore an important part of the company's product strategy. ILLIG firmly believes it is possible to achieve energy savings of up to 30 per cent per machine.

"Illig has always recognized the importance of technology and sustainability," says Jürgen Lochner, CSO/CTO at ILLIG. "We're convinced that energy-efficient thermoforming machines not only promote the business success of our customers but also reduce the environmental impact from manufacturing. Our efforts to improve energy efficiency reflect our commitment to providing innovative solutions that meet the needs of our customers and the demands of the times."

### **Industrial electricity is still expensive**

At a current average price of 26.50 ct/kWh in Germany, the cost of industrial electricity has halved compared to 2022. Nevertheless, the price level is more than 60 per cent above the average for the 10-year period from 2012 to 2021. This was shown by an analysis of electricity prices issued by the German Association of Energy and Water Industries (BDEW) in July 2023.

The high cost of energy is a major challenge for companies, including those in the plastics packaging sector. Energy-efficient thermoforming machines are becoming a cornerstone of ILLIG's strategy to help customers manage the financial burden.

## **An increase in energy efficiency of up to 30 per cent more is possible**

Thermoforming systems require a lot of energy. In sheet processing thermoforming machines, the heating system accounts for the largest share of the energy requirement, typically more than 70 per cent. The remaining 30 per cent is found in the use of electric motors, compressed air generation, and temperature control and cooling units. In the automatic roll-fed thermoforming presses, it is the generation of compressed air and the heating of the semi-finished product that require the most energy. In the case of inline applications, these factors can account for up to 60 per cent of the total energy requirement of a thermoformer.

“The bottom line is that the use of our current thermoforming systems with ILLIG tools can achieve energy savings of up to 30 per cent compared to earlier models,” says Jürgen Lochner.

The new generations of ILLIG machines already consume up to 15 per cent less energy than previous models. This has been demonstrated by measurements made during the production of cups on an RDM 73K, for example. By using an appropriate ILLIG thermoforming tool, it is possible to increase energy savings by a further 15 per cent – and in inline applications this figure can even be significantly higher.

## **More transparency: in future, ILLIG will make energy consumption visible**

With the consumption measurement function available from 2024, the power and energy requirements of the ILLIG systems can be determined and displayed on the control panel (HMI). This means that machine operators can determine the actual consumption figures and evaluate the effectiveness of optimizations applied to the production process.

In addition to power consumption, users will also receive measurements for energy consumption (kWh) per 1,000 parts and energy consumption per kilogram of moulded part weight in future. The latter figure can be used to make comparisons with the injection moulding process. Thanks to material and weight optimization, thermoforming also reduces the energy requirement per moulded part compared to injection moulding.

ILLIG is at the forefront of a paradigm shift in the thermoforming industry, where energy efficiency and sustainability are the drivers of future success. The company's innovation strength and ability to integrate energy efficiency into thermoforming machine design will pave the way for a sustainable future.

**Images:**

1. Energy efficiency at ILLIG: up to 30% energy savings are possible
2. HTSs infrared surface heaters reduce the energy demand of the heating system
3. Roll-fed thermoforming system RDM 73K

See the primer on page 4 for more information.

**About ILLIG**

ILLIG is a leading global supplier of thermoforming, tooling and packaging systems for cardboard, paper and plastics. The company's product and services portfolio includes the development, design, manufacture, installation and commissioning of complex production lines and components. With its unique approach to packaging development, "Pactivity® 360", ILLIG supplies its customers with resource-friendly and sustainable solutions. With its subsidiaries and sales agencies, ILLIG is active in all markets around the world. For over 75 years, the family business has been serving its customers as a reliable partner with innovative technology of unsurpassed quality and comprehensive global service.

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## PRIMER: ENGERGY EFFICIENCY



### Energy efficiency in ILLIG thermoforming machines: the solutions in detail

COVID lockdowns, energy crisis, war in Ukraine and global recession – these are just a few factors that caused operating costs in many commercial and industrial companies to go through the roof in 2021 and 2022.

Plastics processing has always been an energy-intensive production process. The ongoing increase in energy costs for trade and industry are putting many companies under cost pressure. In many cases, it is not easy for manufacturers to pass on the increase in energy costs to customers. This is because the market for thermoformed plastic parts is fiercely competitive – whether in food packaging, non-food applications or automotive parts – and demonstrates a high degree of price sensitivity. This situation is currently being exacerbated by the declining purchasing power of consumers.

This is why the manufacturing and industrial sectors are dependent on identifying previously untapped energy-saving potential and optimizing their entire production chain from an energy perspective. In short, they need to save electricity and become more energy-efficient across the board.

### Sustainability increases the pressure to achieve greater energy efficiency

But that's not the whole story. The fight against climate change, necessary as it is, puts additional pressure on companies to become more energy-efficient along the entire value chain. After all, it is precisely on the consumer side that there is a growing expectation of

industry to operate with a smaller ecological footprint. Organizations that change in this respect can noticeably improve their corporate image. Increasing government regulation in connection with sustainability reporting also increases the pressure to achieve greater energy efficiency.

### **Up to 30 per cent higher energy efficiency in thermoforming**

Thermoforming systems require a lot of energy. In sheet processing thermoforming machines, the heating system accounts for the largest share of the energy requirement, namely more than 70 per cent. The remaining 30 per cent is accounted by electric motors, compressed air generation, and temperature control and cooling units. In roll-fed machines, it is the generation of compressed air and the heating of the semi-finished product that require the most energy. In the case of inline applications, these factors can account for up to 60 per cent of the total energy requirement of a thermoformer.

The new generations of ILLIG machines already consume up to 15 per cent less energy than previous models (test on the RDM 73K). By using an appropriate ILLIG thermoforming tool, it is possible to increase energy savings by a further 15 per cent – and in inline applications, this figure can even be significantly higher. The bottom line is that the use of our current thermoforming systems with ILLIG tools can achieve energy savings of up to 30 per cent compared to predecessor models.

### **Targeted innovations by ILLIG for increased energy efficiency**

ILLIG achieves significant savings in energy consumption primarily by repeatedly introducing a range of innovations to optimize the largest consumer within a thermoforming machine: the heating system.

#### *HTSs infrared surface heater element*

The current ILLIG thermoforming systems exclusively use infrared surface heater elements using a hollow ceramic casting process. Here, heating time is reduced by half compared to conventional infrared heater elements produced using the full ceramic casting process. In combination with improved insulation of the heater elements, this can result in energy savings in heating of up to approx. 30 per cent.

#### *Regulated heating phase*

In RV, RDKP, RDK and RDF machines, steel rule die technology is used for the cutting process. The heating phase of the steel rule die always lasts longer than the heating phase of the ceramic heater element. In order to have both heaters ready for use at the same time

without energy loss, they are heated up independently of each other. This delay of the heating phases – which ILLIG calls the “regulated heating phase” – ensures that the steel rule die and the heater element are ready for operation at the same time in an energy-optimized manner.

#### *Energy-saving mode in machine operation*

The “energy saving mode” is integrated in all new models of the thermoforming systems. In the event of a machine standstill, e.g., production pause or fault elimination, or during a set-up process (roll or tool change), the temperature of the heater is lowered during this period, effectively reducing energy consumption. In addition, the UA/UAF sheet processing thermoforming machines from ILLIG have a weekly timer to switch heaters on and off selectively when there is no production during certain time periods of a working week, for example.

#### *Selective heating control*

Another technical solution for greater energy efficiency is selective heating control. If certain elements of the heater are not required for a production run, they are automatically deactivated. This means that the required heating surface can be individually adapted to production requirements and the energy demand can be reduced.

#### *Closed heating boxes*

It is well known that heat energy becomes “waste energy” whenever energy is converted. This is often counted as a form of energy that cannot be put to further use and is therefore included in energy loss calculations. In order to reduce the proportion of heat energy lost during production and to be able to use waste heat more efficiently, ILLIG makes use of closed, insulated heating boxes in its new machine generations. In the RDM machines, the heating processes take place in a special heating tunnel. This effectively reduces the loss of thermal energy, allowing additional energy savings of up to 5 per cent.

## **Further innovative approaches to energy saving**

Beyond the heating elements of thermoforming systems, ILLIG has also taken a close look at the production process, identified energy guzzlers and developed machine components further to advance energy efficiency.

### *Optimized use of compressed air requires less heating energy*

This includes optimized compressed air consumption for the machine and tools, thereby enabling highly dynamic tool pressure build-up for a fast-forming process. Here, compressed air is introduced at a higher speed and the material can be formed at a lower pressure or temperature. This in turn saves heating energy.

### *Use of servo motors instead of pneumatic drives*

Currently, ILLIG systems are almost exclusively fitted with electric drives (servo motors) instead of pneumatic drives. Unlike pneumatic drives, electric motors convert around 80 per cent of the energy supplied to them into movement. By means of regenerative servo drives, the braking energy of the servo can be fed back into the machine's energy circuit. Finally, the use of new low-maintenance (Mink) vacuum pumps enables further energy savings of up to 19 per cent.

### *Machine upgrades for existing machines*

In order to bring older machine generations up to the latest energy standards as well, ILLIG offers the Energy Upgrade Service, enabling upgrade measures to be implemented at short notice. In this way, reasonable investments can help save electricity costs in the short term. The ILLIG Service Team will be more than happy to advise customers at any time on individual upgrade options including those that improve the performance and longevity of the systems.