Ansys

CASE STUDY /

Ansys and wattron

“Ansys simulation allows us to efficiently determine process parameters in order to exploit the full potential of our innovative technology. It supports us in predicting the benefits our customers will have with our innovative products and in demonstrating the product and process optimizations compared to conventional heating systems.”

Andreas Kunze
Computational Mathematician, Watttron

CASE STUDY

Market Entry of an Innovative Ceramic Heating System via Simulation-based Product Design in Polymer Processing

Thermoforming is important polymer production process; the heating of the initial polymer sheet is essential for the quality, quantity and efficiency of the process. At watttron, we developed an innovative heating technology that allows inhomogeneous, precisely defined heating of surfaces on a very small scale. Using simulations, the necessary parameters for the design of the process can be determined without the need of expensive real-world tests.

/ Challenges

Modular designed matrix heaters are the core of our technology. They consist of many small resistance heating circuits in the form of square pixels printed on thin, isolated ceramic substrates. These matrix heaters enable us to generate temperature profiles specifically adapted to given products or molds. Simulation allows us to efficiently determine the optimal temperature for each pixel, which would be a time- and resource-consuming task if done by hand.

/ Technology Used

Ansys Mechanical

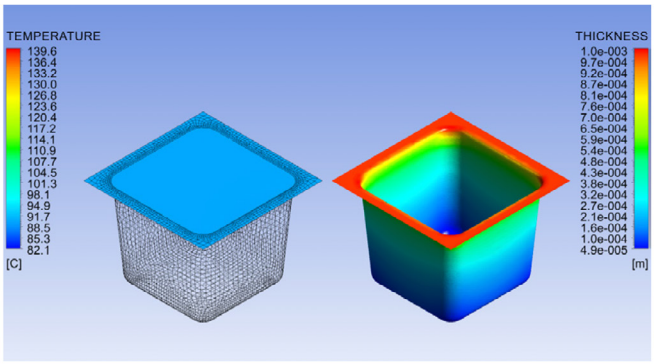
Ansys Polyflow

Ansys SpaceClaim

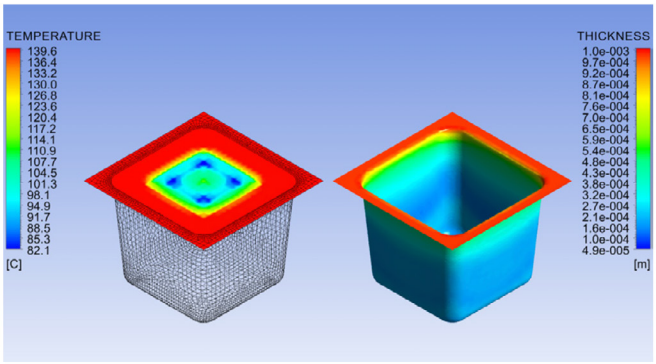
/ Engineering Solution

We developed a powerful algorithm that iteratively updates the temperature profile depending on the results of the thermoforming simulation. In a fully automated workflow, we start the optimization process with the simulation of the thermoforming process and an initial (standard) temperature profile. The result of this simulation is the initial wall thickness distribution.

Then, our algorithm uses this data to update the temperature profile and starts the thermoforming simulation for the second run. This procedure is repeated until the wall thickness distribution is nearly constant at every position of the forming product.



Homogenous temperature profile (left) and resulting wall thickness distribution (right) for a simple test cup.



Optimized temperature profile (left) and resulting wall thickness distribution (right) for a simple test cup.

/ Benefits

- Decreases time and costs for process parameter determination.
- Provides faster feedback to our customers.
- Allows fast return on investment.

/ Company Description

The watttron company is a spin-off from the University of Technology, Dresden, and Fraunhofer IVV Dresden, founded in February 2016. We aim to pave the way to revolutionize packaging and various other industrial processes.

Our innovative heating technology is superior to current heating systems in many ways and offers a number of advantages. Depending on the application, we can improve the flexibility and control of the process, in addition to increasing the efficiency and, at the same time, improving a product's quality.

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