

Thermoforming

Shaping of sheet structures

Process

Thermoforming or deep-drawing is an established and large-scale production process used to shape thermoplastic sheets. Before shaping, one side of the sheet material is heated up to the softening range and then pulled over a thermoforming mold using negative pressure (vacuum). After the sheet is shaped, the component is cooled with a fan, thus ensuring dimensional stability. Finally, the sheet is demolded by blowing in air and simultaneously lowering the mold.

One disadvantage of this method is that the impression is only taken on one side of the sheet and therefore the contour can only be accurately reproduced on one side.

This also results in different wall thicknesses along the component, which depend on the initial thickness of the sheet and the degree of forming. In addition, the venting holes in the thermoforming table have a decisive influence on the quality of the component. However, the process also has important advantages, which outweigh the disadvantages: by using a wide variety of input materials from simple to fiber-reinforced plastics, investigations can be carried out in multiple areas. In addition, the components can be manufactured quickly and cost-effectively.

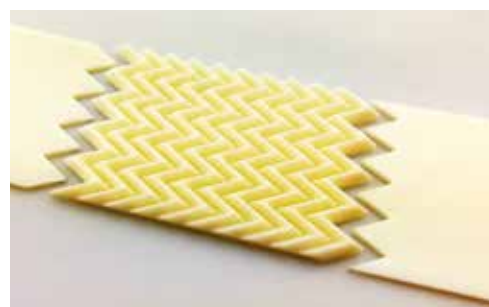
Our offer

We offer our customers services ranging from basic investigations and feasibility studies through to the optimization and processing of components.

- Development of thermoforming tools
- Determination of manufacturing parameters
- Testing and characterization of components



Thermoforming table



Printed ABS thermoforming mold



Aluminium thermoforming mold

Machine data

Manufacturer:	ILLIG
Year of manufacture:	2002
Mold size:	350 × 250 mm
Forming depth:	approx. 90 mm
Heating field temperature:	max. 590 °C
Extra equipment:	Cooling fan, compressed air polarity reversal for demolding

Sheet material used

So far, experience has been gained with the following thermoforming sheets:

- Plastic sheets
- Foam sheets

Thermoforming molds

Molds can be produced using the following materials and manufacturing processes:

- 3D-printed molds made of ABS
- 3D-printed metal molds
- Metal molds
- Wooden molds



Foam sheet cuboid



Composite of XPS and PS



Thermoforming machine ILLIG KFG 37

Contact

Angela Schwarz
Polymer Engineering
Phone +49 721 4640-825
angela.schwarz@
ict.fraunhofer.de

Fraunhofer Institute for
Chemical Technology ICT
Joseph-von-Fraunhofer-
Strasse 7
76327 Pfinztal (Germany)

www.ict.fraunhofer.de