



Shanghai Zhanshi Explores the Working Principles & Key Benefits of Vacuum Thermoforming Machines

Shanghai, China, 10.10.2025 - As global businesses continue to explore cost-effective and efficient manufacturing methods for plastic component production, vacuum thermoforming machines have emerged as indispensable tools. In response to increasing customer inquiries and rising market adoption, **Shanghai Zhanshi Mechanical Equipment Co., Ltd.**, a leading Chinese manufacturer of thermoforming machinery, has today released a detailed breakdown titled "**Vacuum Thermoforming Machine** Explained: What It Is and How It Works." The press briefing was led by Lewis, the company's Technical Sales Manager.



Shanghai Zhanshi Offers an In-Depth Look into the Working Principles and Benefits of Vacuum Thermoforming Machines for Modern Manufacturers

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What Is a Vacuum Thermoforming Machine?

Fundamentally, a **vacuum thermoforming machine** is designed to shape thermoplastic sheets into finalized parts or packaging by applying heat and using vacuum pressure. While often associated with packaging, vacuum thermoforming is also widely used for creating durable, functional, and complex plastic parts in various industries.

The process involves heating a plastic sheet until it becomes soft and pliable, then stretching it over or into a mold. A vacuum removes the air between the mold and the sheet, causing the plastic to conform precisely to the shape of the mold. Once cooled, the hardened element takes the mold's final form and is ready for use or secondary processes, such as trimming.

How Does the Vacuum Thermoforming Process Work?

According to Lewis, the workflow of a [vacuum thermoforming machine](#) typically follows these detailed steps:

Step 1: Sheet Loading

- The process begins by placing a thermoplastic sheet into the machine.
- Materials typically come in roll or sheet format, depending on the machine type.

Step 2: Heating

- Radiant or infrared heaters raise the material temperature to the forming threshold (typically between 140°C and 250°C, depending on the plastic type).
- Heating can take place from the top, bottom, or both, based on part requirements.

Step 3: Forming Over Mold

- Once the material becomes pliable, a vacuum is applied to draw the softened sheet tightly over a pre-shaped mold.
- Some machines also use plug-assist or pre-stretching to ensure even material distribution.

Step 4: Cooling

- The formed plastic cools down, which solidifies its new shape.
- Advanced systems include high-speed fans or chill bars for faster cooling.

Step 5: Trimming and Finalizing

- Excess material (flashing) is trimmed off using manual or automated routers or dies.
- The finished product is collected, and leftover material can often be recycled.

Key Components of a Vacuum Thermoforming Machine

To better understand the mechanics behind the process, it's useful to examine the major subsystems of a standard [vacuum thermoforming machine](#).

A. Heating System

- Uses quartz, ceramic, or infrared heaters
- Advanced models offer zoned heat control for accurate temperature gradients

B. Clamping Frame

- Holds the plastic sheet in place during heating and forming
- Adjustable to accommodate different sizes and thicknesses

C. Forming Station

- Includes the mold (either positive or negative), vacuum channels, and (optional) plug assist
- The heart of the thermoforming process

D. Vacuum System

- Removes air instantly and uniformly from between the mold and the sheet
- High-quality pumps allow for faster cycle times and better definition

E. Cooling System

- Reduces part quenching times
- Includes fans, chillers, misting units

F. Trimming Station (Optional)

- Automated CNC routing or die-cut systems for high volume
- Ensures clean edges and uniformity

Shanghai Zhanshi integrates all these components into compact, energy-efficient systems, optimized for various industrial needs.



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Professional thermoforming machine manufacturers [Shanghai Zhanshi Mechanical Equipment Co., Ltd.](http://www.vacuumac.com) is committed to research and development, innovation, and the production of various plastic vacuum thermoforming machines, plastic high frequency welding machines, and plastic extrusion machines.

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