



**WAVEFORM  
PLASTICS**  
technologies Ltd.

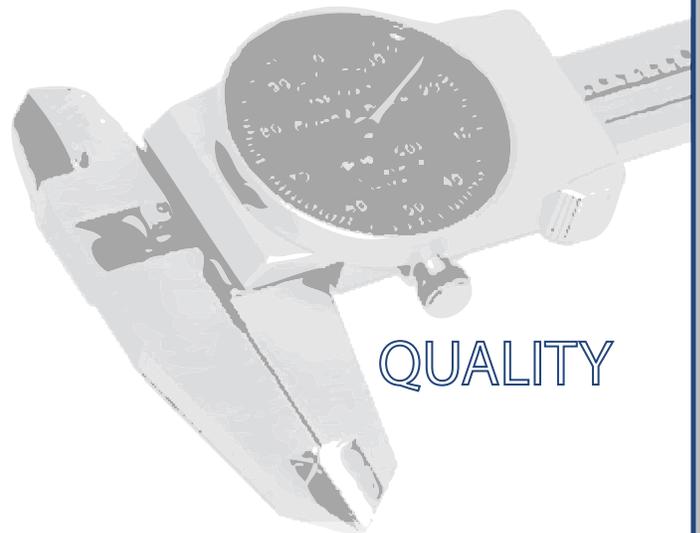
# *Thermoforming*

*from Design to Prototype to Production*

TOTAL SUPPORT



QUALITY



ON TIME



COST EFFECTIVE



*We're Part of Your Team.*

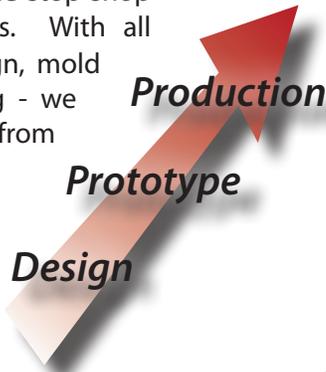


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## A Full-Service Thermoformer

Waveform provides you with a one-stop-shop for all your thermoforming needs. With all services in-house - including design, mold fabrication, forming, and trimming - we can take your idea, large or small, from design to prototype to production.

Waveform's fully automated, radiant heat production ovens ensure consistent results every time. We are capable of forming parts from sheets as large as 9 feet x 5 feet, so making almost any part is possible.



## About Thermoforming

Thermoforming occupies a unique niche in the plastics industry, offering many benefits over other plastics molding techniques. Low tooling costs allow thermoforming to compete directly with various other fabrication techniques while achieving higher production rates and lower part costs. The greatest economies in thermoforming are achieved at low to moderate volumes (10 to 10,000 units per year depending on the part size).

## Wide Range of Experience

Waveform Plastics supplies thermoformed components to a diverse range of industries and applications, including:

- Medical devices and appliances
- Electronics, instrumentation
- Manufacturing
- Marine
- Advertising & POP displays
- Consumer Products
- Specialty Products



## Wide Range of Materials

We work with a wide range of materials, of varying thicknesses and colours.

- ABS
- PETG
- Polyethylene
- Acrylic
- Styrene
- Lexan
- Specialty Materials
- Custom colours, sizes, thicknesses



***We're Part of Your Team.***

# It's All About "Total Support"

## Total Support

We pride ourselves on our "Total Support" approach, providing you with the support you need at every stage of your project, ensuring that we achieve the best possible solution for your application - optimum manufacturability, quality, and cost-effectiveness.

### DESIGN & ENGINEERING SUPPORT

Waveform offers in-house Computer Aided Design services, and can create a design from scratch, or we can work from your design to create prototype and production tooling. We will work with your engineers right from the concept stage, to assist in creating the optimum design, using the most suitable materials for your application.

### CAD & CNC MACHINING

The combination of excellent CAD tools, experience, and skill ensure that the mold is CNC machined precisely to your design, from a range of materials appropriate to the expected life of the tool. Designing with Solidworks and MasterCAM, we can import most standard CAD formats, such as AutoCAD, STEP, and IGES.

Our in-house machine shop and experienced machinists ensure that we make the best tooling for the job, with short leadtime, and quick response to change requests. Our capabilities include a full range of machining services, including CNC milling.

Our 3- and 5-axis CNC routers allow us to accurately trim even the most complex parts, programmed directly from the original part CAD model.

### PROTOTYPING

As you work through your design process, we can provide prototype parts as needed. We know that time is critical during your development cycle, and we make it a priority

to provide quick turnaround for prototypes.

### PRODUCTION SERVICES

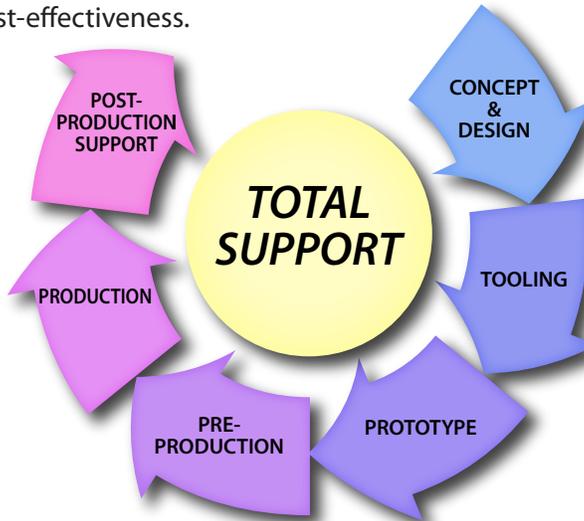
We provide a full range of services to support your production needs:

- Custom manufacturing
- CNC Trimming and finishing
- Assembly & Packaging
- Quality Control

### POST-PRODUCTION SUPPORT

We can continue to provide support, as needed, after you move into production. For

example, with our stocking programs, we can provide warehousing, JIT shipping and logistics services. Let us know your requirements, and we'll work with you to develop a program that provides the ideal level of support.



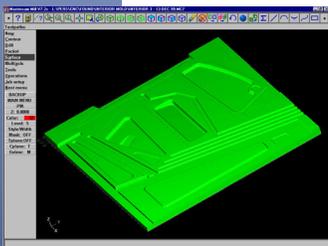
## Quality

Ensuring a consistent, quality product is as important to us as it is to you. Waveform tailors our quality program to your job's requirements. Every product has specific quality targets, either based on your own requirements, or on our internal quality expectations.

A housing for a medical instrument will have very different quality standards from a precast concrete mold. Tolerances, surface finish standards, and materials differ. We will work with you to ensure that we achieve the quality needed for your application.

If required, we can provide detailed part inspection reports and other analytics, as required by your QA program.

Contact us if you require adherence to any specific quality standards or have any specialized reporting requirements.



## The Thermoforming Process

In case you're not familiar with the thermoforming process, here's a quick summary of the main steps.

### 1. Design the tooling.

The mold, also referred to as the tool, is typically designed using 3D CAD software such as Solidworks. The mold needs to meet specific criteria, which ensure that the part can be formed correctly and consistently, and can be removed easily from the mold. Typically, the material to be formed is also selected at this time, as characteristics of the material will affect the design of the mold. Typical materials are ABS, Styrene, PETG, Lexan, or Acrylic, to name a few.

### 2. Create the mold.

Molds are usually machined using a CNC mill, directly from the CAD design, but may also be cast from an existing part, or machined using other methods. Depending on the application, molds may be fabricated from aluminum, composites, wood, or other materials. Each offers unique price/performance characteristics. While molds used for injection molding are typically made of steel and are very expensive, thermoforming molds are far more economical.

### 3. Form the part.

Once the mold has been created, you're ready to form parts. This involves installing the mold, and programming the thermoforming machine to the desired characteristics, such as oven temperature and heating time, based on the material being formed. Then, a plastic sheet is placed into the oven and heated. Once at forming temperature, it is removed from the oven, placed over the mold, a vacuum applied, and allowed to cool. Several test cycles are typically run, making adjustments to various parameters, such as temperature, cycle time, and other forming adjustments. Initial parts are carefully inspected to ensure that they are formed cleanly and to specification. Our equipment fully automates the heating and forming process, helping to ensure that every part is the same.



## Our Services, at a glance...

- In-house CAD Design
- In-house mold fabrication
- Quick-turn Prototyping
- Production Thermoforming
- Precision CNC Trimming
- Custom Manufacturing
- Assembly and Packaging

## Give us a call!

We're ready to help with your forming needs! For more information, to evaluate a current requirement, or to request a quote, contact us by voice, FAX, or email.

You can also learn more about Waveform Plastics Technologies by visiting us on the web, at [www.waveformplastics.com](http://www.waveformplastics.com).

We look forward to being your design and manufacturing partner!



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Waveform Plastics respects our environment, and we recycle waste whenever possible. Plastic waste from our manufacturing process is ground and returned to our suppliers for reprocessing.