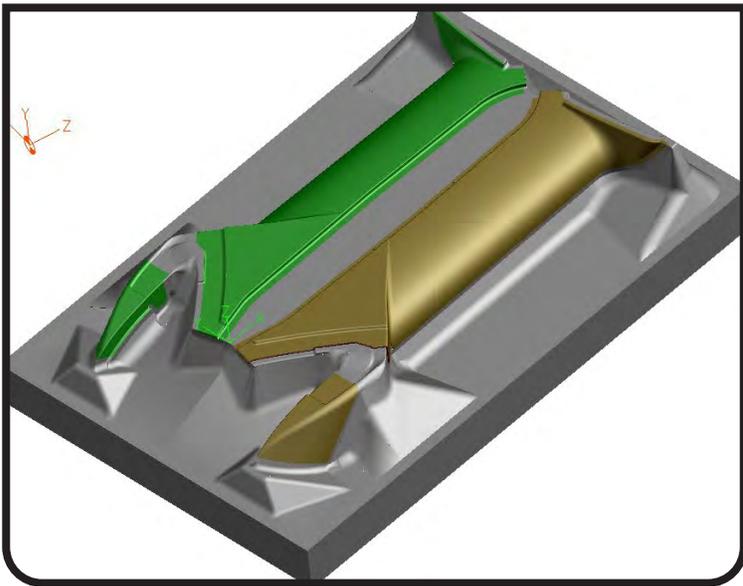


## WHAT IS THERMOFORMING?

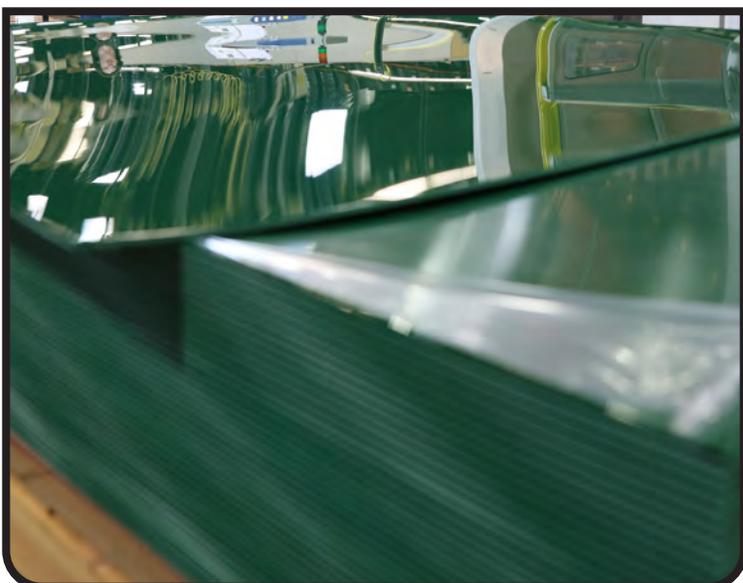
Is thermoforming a suitable process for a particular part? A basic understanding of the process will help provide an answer to that question.

Thermoforming consists of heating an extruded sheet of plastic until it is malleable enough to form it into a three dimensional shape.



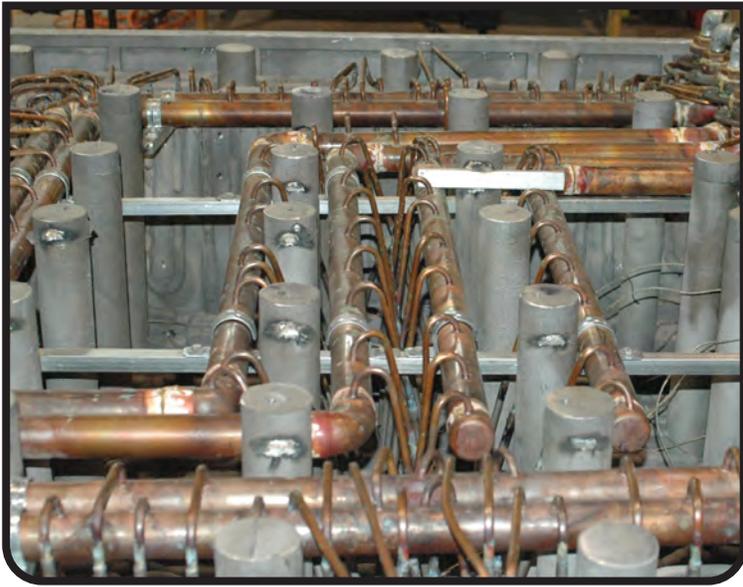
The design of the part is critical to the process. Heating a sheet of plastic material until vacuum, pressure or both can be used to conform the material to a mold has certain advantages and limitations. The Design stage is critical to successful manufacturing and is the optimum time to get the thermoformer involved with the project. A good design will leverage the benefits of thermoforming and minimize the limitations.

Once the design is completed, a CAD file will be needed to produce a mold used to form the parts. Tooling for long term production is optimally cast or machined aluminum, due to its ability to conduct heat for an efficient cycle time and to produce high quality parts. Other materials, such as wood, composite or Ren can be used for prototype tooling or limited production runs. Thermoforming molds are significantly less expensive than injection molds.



Extruders produce plastic sheet used for thermoforming from a variety of materials. ABS, Polyethylene, polypropylene, PETG, PVC, Acrylic and TPO are some of the more commonly used plastics. Extruders can layer materials to form a substrate with a cap having properties for certain applications (UV resistance) or for esthetic reasons (high gloss).

The plastic sheet is clamped into a frame on a thermoforming machine and heated in an oven until it becomes soft enough to form over a mold. The sheet, once it is pliable, will be shaped by the tooling (mold) by using vacuum and/or pressure.



The part will be removed from the mold once it is cooled by the use of water lines in the mold and Fans.

Afterwards, the thermoformed part will be trimmed to its final shape using a 3 or 5 axis CNC router, which can also drill holes or route patterns in the part to attach the part to other components. CNC machines are highly efficient and can meet rigorous specifications.



Secondary operations (fasteners, painting, PAD printing, screen printing, assembly) can be utilized to add value.

Thermoforming is an effective process for prototyping and production of high quality parts numbering in the hundreds to thousands. It is particularly efficient for larger parts.

**ThermoPro** has been a successful heavy gauge thermoformer since 1998 and produced high quality parts for diverse markets including office, POP, Recreational Vehicles, Golf Carts, Scientific equipment covers, Kiosks and Exercise equipment.