



# FIBER PAD, INC.

An ISO 9001:2008 & AS9100:Rev. B Certified Company

## Thermoforming & Vacuum Forming Design Guide

This Design Guide is useful as a reference tool when developing a part for production. The guidelines are generic as each plastic resin has different properties and characteristics important to the thermoforming process. Part tolerances are oftentimes dependent upon the material chosen for production. If you have any questions contact one of our plastic specialists at 918.438.7430 or email [info@fiberpad.com](mailto:info@fiberpad.com).

### General Practice:

- Dimensions must be drawn to and from **controlled surfaces**.
- The **controlled surface** on a molded part is the surface against the Mold.
- Call out for Mold Relief (+ draft or - draft angle from datum) ...2° typical.
- Variance in thickness of Stock Material is typically ...± 10% from sheet vendor.
- Material stretch is dependant upon Mold configuration.

### Formed Features:

Distance	Pressure Forming	Vacuum Forming
Less than 6"	± .015"	± .020"
6" to 12"	± .020"	± .025"
12" to 18"	± .025"	± .030"
Above 18", add	± .002" per inch	± .002" per inch

*Excludes Polyethylene*

## CNC Trimmed Features:

- Machined features from a formed surface  $\pm .030$ "
- "Cut to cut"  $\pm .020$ "
- Hole Diameter  $\pm .010$ "  $< 2$ "

## Free Quote:

When requesting a quote or part analysis, we prefer to receive 3D solid models. We use the Esprit platform and prefer to use the following file types:

- SolidWorks (\*.sldprt)
- IGES (\*.igs or \*.iges)
- Parasolid (\*.x\_t or \*.x\_b)
- STEP (\*.step or \*.stp)

## Materials

We work with several different types of plastic and plastic resins in thermoforming and vacuum forming. Here is a list of plastics that we work with frequently. If you don't see your plastic of choice on the list, give us a call, we probably have experience with it.

Material	Properties	Typical Applications
<a href="#">ABS</a> (acrylonitrile butadiene styrene)	Strong, rigid, light, shock absorbent	Most widely used material for general applications, including covers, shrouds, escutcheon, automotive body parts, enclosures, protective headgear, toys, etc.
<a href="#">HMWPE</a> (high molecular weight polyethylene)	High impact strength, chemical resistant, puncture resistant, tough, even at low temperatures	Medical joint replacement, recreational skis, bottles
<a href="#">HDPE</a> (high-density polyethylene)	Strong, solvent & corrosion resistant, easily recyclable	Truck-bed liners, ducts, hoods, cutting boards, containers
<a href="#">HIPS</a> (high impact polystyrene)	Stiff, low impact, inexpensive	Food containers, point-of-purchase displays

<a href="#">PVC</a> (polyvinyl chloride)	Flexible, chemical resistant, flame resistant, highly versatile	Packaging, cling film, bottles, credit cards, audio records, medical packaging
<a href="#">TPO</a> (thermoplastic olefin)	Very tough, excellent cold resistance, low thermal expansion, excellent UV resistance	Automotive skirts and fenders
<a href="#">Pennite</a> (glass filled nylon)	Strong, stiff, cost effective replacement for metal	Automotive air ducts, radiator shrouds, fuel cell covers
<a href="#">Kydex</a> { <a href="#">T</a> , <a href="#">100</a> , <a href="#">1900</a> , <a href="#">6185</a> , <a href="#">6565</a> }	High impact strength, high and low temperature performance, flame resistant	Automotive & aerospace applications, air ducts, galley parts, paneling, shrouds, tray tables, bulkhead laminates lighting housings
<a href="#">Royalite</a> { <a href="#">R12</a> , <a href="#">R20</a> , <a href="#">R57</a> }	Durable, high impact strength, high tensile strength, high and low temperature performance	Automotive & aerospace applications, instrument panels, food trays, motorcycle fairings, luggage
<a href="#">LEXAN</a> { <a href="#">9600</a> , <a href="#">9604</a> , <a href="#">9605</a> , <a href="#">F60011</a> , <a href="#">F60012</a> , <a href="#">F60025</a> , <a href="#">F60029</a> , <a href="#">F6006</a> }	Great variability, flame resistant, weatherable, tough, scratch resistant	Eye wear & protection, food containers, healthcare & aerospace applications
<a href="#">PEI</a> (polyetherimide)	Heat resistant, flame resistant, solvent resistant	Medical components, manifolds electrical insulation parts, semiconductor equipment components
<a href="#">Acrylic</a>	Strong and resists weathering, flexible, resistant to most chemicals and industrial fumes, good insulator	Consumer displays, signs, kitchen cutting boards, panel assemblies, casings
<a href="#">PETG</a> (polyethylene terephthalate glycol)	Lightweight, excellent transparency, high gloss surface, high impact resistance, recyclable	Food & liquid containers, gas & moisture barrier, soft drink bottles,

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