

# Comparing Concept to Reality<sup>1</sup>

We began our discussion of part design by reviewing why we might not want to quote on a job. If we are serious about fabricating the customer's concept, we need to understand the methodology in reducing a concept to reality.

## *Naïveté v. Experience*

Before we consider developing a hard cost for a given project, we need to ascertain the technical level the customer brings to the design. Most of us have dealt with customers of at least one of the following levels:

- **Expert Customer.** Fully cognizant of the advantages and limitations of thermoforming in general, conversant of the plastics characteristics, and having a complete understanding in the myriad ways of fabricating his design, in particular.
- **Experienced Customer.** Has designed certain parts in thermoforming in the past but is not up-to-date, vis-a vis<sup>2</sup>, newer processing techniques, mold materials, polymers, and so on.
- **A Non-Thermoforming Technical Customer.** Has extensive experience in blow molding, rotational molding, or injection molding, but has no knowledge of the differences between these techniques and thermoforming.
- **A Technically Naïve Customer.** Knows little about plastics and nothing about thermoforming. Has always purchased his

plastic products to either mate with or package his non-plastic products.

- **The Totally Naïve Customer.** Has a great idea worked out on the back of a Burger King napkin, has no funding, no customer, and no idea how to reduce his idea to reality.

We all agree that it is very difficult to treat each of these in the same fashion. In other words, a checklist of things necessary to reconcile prior to quotation might be too technical for the naïve customer and an insult to the experienced one. Nevertheless, we should all keep in mind before every take-off and landing, the pilot and copilot are required to complete an extensive checklist, regardless of their years of experience and the number of times they had flown the specific airplane. So let's take a look at a typical design checklist.

## *General Advantages and Limitations of Thermoforming*

We all know the advantages and limitations of our skills. But the customer may not. So tell him/her. Some advantages:

- Lower tooling costs
- Quicker design-to-prototype time
- Quicker prototype-to-production time
- Relatively wide selection of polymers, grades
- Large surface area per unit thickness
- Economic production of a few pieces (heavy gauge) or many, many pieces (thin gauge)

Some limitations:

- Non-uniform wall thickness
- Single-surface molds
- Hollow parts difficult
- Sheet cost



- Extensive trimming, recycling needed
- Mostly neat plastics (few reinforced and highly filled plastics)
- Wide forming windows desired (needed)

## *The Material Issue*

We, along with the astute customer, need to discuss material choices in some detail. It is not enough for the customer to specify "general purpose polystyrene." He/she needs to work with us to develop a list of property requirements. In other words, what are the elements of the environment in which the product must perform? Some examples are:

- Environmental temperatures (high and low)
- Corrosive/erosive conditions
- Static/dynamic loading conditions
- Impact conditions
- Surface quality
- Product lifetime
- Assembly restrictions (if any)

And we must all be aware that some of these conditions are compound. For example, the product may need to withstand dynamic loading at high temperature in a corrosive environment. And the customer must understand that not all grades of plastics that meet the desired criteria are available in sheet form.

Before we can discuss design concepts with our customer, we need to review them ourselves. We'll continue this litany after our review. ■

**Keywords:** *advantages, limitations, material choice, experienced customer, naïve customer*

<sup>1</sup> This is the second in a series that focuses on part design

<sup>2</sup> vis-à-vis, French for face-to-face, with the usual meaning being "as compared with" or "in relation to."