

Value of Expert Product Design

Concept | Development | Prototyping | Manufacturing

- Improve product quality and performance while reducing costs.
- Minimize delays and expensive design & tooling changes.

Armed with a rough sketch or concept model for a new product, many small companies, designers and inventors often exclaim:

“Why can’t I just get a 3-D CAD model?” or
“Why can’t I just make a prototype?”

In short, a product is a design not just a concept. Big difference.

Every product must be designed with an intimate understanding of how it will actually be fabricated or molded. Since prototype parts should mimic the quality of actual manufactured parts, their design requires extremely high levels of knowledge and precision. Parts must be absolutely right or prototyping costs could be wasted.

Common Design Mistakes

- 1 A product is a design that is tool ready, not a concept sketch or model.**
An intelligently designed product in 3-D CAD requires no interpretation (tool-ready) by the prototype or production vendor. In fact, many vendors will not accept imperfect designs with errors.
- 2 Rapid prototyping requires a detailed 3-D CAD file.**
A 3-D CAD file translates product design data into a format (STL file) that is communicated to the prototyping machinery to fabricate parts. If the STL file is not exactly perfect, the parts will contain errors that compromise product quality.
- 3 Design errors can cause expensive delays, added design fees and further prototyping and tooling costs.**
If design mistakes crop up late in the prototyping process, quick fixes are not easy and delays can endanger business objectives.
- 4 Prototyping simulates manufacturing**
The reason that ultra-accuracy in part design for prototyping is so critical is because it should represent an actual manufactured part to the highest degree possible. Intimately understanding the interrelationship between the product (design), prototyping (method) and tooling method (injection molding) is critical.
- 5 There are no low-cost short-cuts in product design.**
Many CAD software programs lead inventors and designers to believe that prototyping is a push-button process. In reality, however, it is far more complex and intricate. Such sophistication is the reason why prototyping is so important and tooling is so expensive.



Added Value

From art to part

At every step in the product development process – from the start of Phase 1, Concept, and especially in Phase 2, Development, SPARK is constantly evaluating both the big picture and the details to identify the most cost-effective design directions and options to achieve high-quality prototyping and manufacturing.

Do what is required, not just what the client asked for

Far from doing simply what we are told to do, SPARK takes the time to collaborate with the client and assess design strategy. We want to make sure the development budget is invested wisely – and that we guide you through the pitfalls of the process to get it right the first time.

Address all design issues

On every project, SPARK conducts a rigorous assessment of all critical product design, engineering, prototyping and manufacturing criteria. Such attention to detail born from years of experience insures high-quality results.

“Blueprint” for success

SPARK’s track record in prototyping and design for production is noteworthy. In fact, our 3-D CAD models are regularly accepted by vendors without the need for any changes. Such experience and savvy with 3-D CAD and prototyping defines a “blueprint” for client success.

Bottom line: an expertly-designed product results in high-quality prototype and production parts. In turn, high-quality products build market-winning companies.

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Critical Design Knowledge

Even today’s 3-D CAD software cannot magically design plastic parts for fabrication. Only years of experience and skill in knowing exactly how parts are actually made by sophisticated steel tooling can deliver cost-effective prototype and production parts.

1 Expert understanding of the complexities and intricacies of plastic part design.

The successful design of plastic prototype parts are the direct result of veteran experience and skill. SPARK rigorously evaluates every essential detail – down to fractions of millimeters – to save clients time, money and headaches.

- Part size & orientation
- Uniform wall thickness
- Part fit & snap-fits
- Clearances & tolerances
- Part draft & radii
- Ribbing & core outs
- Bosses & gussets
- Tool action (slides, lifters, cams)
- Part ejection

2 Thorough, focused attention to detail equals high quality.

Combined with plastic part design, critical process steps must be intelligently executed to expect on-time, high-quality results.

3 Specify the right plastic (resin) & tooling method.

Every plastic product part is different and requires insight about its shape, performance and durability as well as the material being used. Far from an automatic step, successful injection molding is the result of intimately working with CAD technology and a wide range of plastics for over two decades.

4 Cost of changes.

When product design issues are thoroughly and correctly identified and solved early in the product development process, costs and delays are dramatically reduced. Conversely, design changes late in the process can be very expensive.

Examples



Part draft
Angled surfaces for part ejection



Core out
Internal cavity



Wall thickness
Nominal thickness



Bosses
Designed for strength



Ribbing
Proper wall support

Can you spot the tool-ready 3-D CAD design?

The Nib
Golf Bag
Putter
Holder



On-screen, 3-D CAD models and even actual prototype parts can appear – to the untrained eye – to be “ready” for prototyping, which is the critical checkpoint before making a large manufacturing investment.

Any single mistake in any part design detail – even an error of fractions of millimeters – will result in a part flaw. Such a flaw will produce an inferior, sub-standard part and jeopardize the quality and market success of the product. Moreover, such errors can cause expensive tooling – from \$10k to over \$100k – to be scrapped.

The answer: A

Design Differences

- While seemingly a simple product, the Nib required an ingenious tooling solution: five separate slides (tool actions) to achieve the complex curves and shapes.
- Every surface requiring draft (part surface angle) is detailed to capture every critical detail to insure proper ejection from the injection-molded steel tooling.
- Expertly maintained a perfect, exterior ball shape and dimples by allowing for internal part deformation (non-aesthetic).

The Nib Inventor – Client Quote

“I turned to SPARK to translate my idea into a real product – one of the best business decisions I ever made. They made the difference between cost-effective success and expensive failure in bringing this product to market.”