Checklist

**General**
- Performance Requirements (Structural, Aesthetic, etc.)
- Combining Multiple Parts or Functions
- Structural Load (Static, Dynamic, Cycling, Impact, etc.)
- Environment (Temperature, Time, Chemical, etc.)
- Tolerance Requirements
- Life of Product
- Quantity of Product vs. Fabrication Process
- Secondary Operation
- Packaging and Shipping

**Environment**
- Temperature
- Time
- Load
- Other Environments (Chemical, Water, Humidity, etc.)

**Engineering Design Facts**
- Type of Load
- Frequency of Load
- Stress Rate (Compression, Tensile, Flexural)
- Strain Amplitude
- Load Deformation (Tensile, Compression, Shear, etc.)
- Apparent Modulus (Includes Strain Due to Creep)
- Direction of Load
- Correlating Test Data With End Use
- Safety Factor

**Tests (ATIM, SAE, UL, Etc.)**
- Tension
- Compression
- Creep
- Dynamic/Fatigue/Torsion
- Impact
- Poisson’s Ratio
- Electrical
- Continuous Service Temp./U.L. Temp. Index

**Material and Process**
- Directional Flow
- Directional Layout of Reinforcements
- Regrinding
- Pre-drying
- Prototyping (Machining, Molding)

**Appearance**
- Style
- Shape
- Color
- Surface Finish/Weld Lines/Flow Lines/Parting Line/Gate Location
- Decoration

**Economic Factors**
- Cost of Present Part
- Cost Estimate of Part in DuPont Engineering Plastics
- Faster Assembly and Elimination of Finishing Operation
- Redesign Part to Simplify Product
## Designing for Uniform Walls

<table>
<thead>
<tr>
<th>WRONG</th>
<th>RIGHT</th>
<th>WRONG</th>
<th>RIGHT</th>
</tr>
</thead>
</table>

![Wrong 1](image1) ![Right 1](image2)

![Wrong 2](image3) ![Right 2](image4)

![Wrong 3](image5) ![Right 3](image6)

### Central gate

Problem may be solved by proper web dimension. In some cases properly dimensioned ribs may be used to fill the exterior crown.

![Wrong 4](image7) ![Right 4](image8)

![Wrong 5](image9) ![Right 5](image10)

![Wrong 6](image11) ![Right 6](image12)
Designing for Ribbed Walls

Adequate ribbing can counteract bending. However, ribs should not be used unless necessary (e.g., not for small modulus high precision gears.)

Stressed parts in a transparent material show, under polarized light, the stress concentration effect of sharp corners.

Here are two alternative solutions; their choice will depend on the torque to be transmitted.

Designing without Stress Concentration

Stressed parts in a transparent material show, under polarized light, the stress concentration effect of sharp corners.

Circular inserts with fine rounded knurling are preferred. They should not have sharp edges. Installing inserts after molding may also be a solution.
### Gate Location

<table>
<thead>
<tr>
<th>WRONG</th>
<th>RIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Wrong Gate Location" /></td>
<td><img src="image2" alt="Right Gate Location" /></td>
</tr>
</tbody>
</table>

- The two ways to solve this problem are:
  - A) Locate the gate in the thicker section (a long cycle may however be necessary to pack the cavity properly).
  - B) Core out the part.

### Designing for Assembly

<table>
<thead>
<tr>
<th>WRONG</th>
<th>RIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image3" alt="Wrong Assembly Design" /></td>
<td><img src="image4" alt="Right Assembly Design" /></td>
</tr>
</tbody>
</table>

- Redesigned exterior snap-fit cap and addition of "O" ring eliminate leakage.
- No undercut in the mold. If the ratio $L:L_1$ increases, some ribs can be added.
- Engineering plastics usually resist compression stresses better than tensile stresses. Threads should be provided around the exterior diameter of the plastic part. An "O" ring ensures tightness.
- Relief allows snap-fit without breaking.

### Designing with Clearance on Threads

<table>
<thead>
<tr>
<th>WRONG</th>
<th>RIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image5" alt="Wrong Thread Design" /></td>
<td><img src="image6" alt="Right Thread Design" /></td>
</tr>
</tbody>
</table>

- Threads should be provided around the exterior diameter of the plastic part. An "O" ring ensures tightness.
- Relief allows snap-fit without breaking.

- "L" should be kept larger (at least $D$), and a flat head screw would eliminate tangential stresses. A change in gate location could also help.
The data listed here fall within the normal range of properties, but they should not be used to establish specification limits nor used alone as the basis of design. The DuPont Company assumes no obligations or liability for any advice furnished or for any results obtained with respect to this information. All such advice is given and accepted at the buyer’s risk. The disclosure of information herein is not a license to operate under, or a recommendation to infringe, any patent of DuPont or others. DuPont warrants that the use or sale of any material that is described herein and is offered for sale by DuPont does not infringe any patent covering the material itself, but does not warrant against infringement by reason of the use thereof in combination with other materials or in the operation of any process.

CAUTION: Do not use in medical applications involving permanent implantation in the human body. For other medical applications, see “DuPont Medical Caution Statement,” H-50102.