Part Design & Assembly
Mechanical Attachments

Mechanical Methods

Mechanical methods include techniques such as screw fastening, riveting, or snap-fits which employ a fastener or physical means of part assembly. These techniques are used for applications requiring non-destructive disassembly or rapid assembly with low capital investment. Unlike other fastening methods, these techniques are readily used for joining all materials, including metals. Plexiglas acrylic resins may be joined with themselves or other materials, providing appropriate design considerations have been taken.

Accumulation of material, not only in walls, but at joints and corners should be avoided by coring out. Good practice aims at minimizing risk of sink marks, voids and deformation in the design process.

Plexiglas® acrylic plastic is a combustible thermoplastic. Observe fire precautions appropriate for comparable forms of wood and paper. For building uses, check code approvals. Impact resistance is a factor of thickness. Avoid exposure to heat or aromatic solvents. Clean with soap and water. Avoid abrasives.

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### Screw Attachment Design Guidelines For Plexiglas Acrylic Resins

<table>
<thead>
<tr>
<th></th>
<th>Plexiglas V-Series</th>
<th>Plexiglas MI7</th>
<th>Plexiglas DR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pilot hole (d)</td>
<td>&gt; or = 0.90 x screw OD</td>
<td>&gt; or = 0.90 x screw OD</td>
<td>&gt; or = 0.85 x screw OD</td>
</tr>
<tr>
<td>Boss diameter (D)</td>
<td>&gt; or = 2.5 d</td>
<td>&gt; or = 2.5 d</td>
<td>&gt; or = 2.0 d</td>
</tr>
<tr>
<td>Screw guide (p)</td>
<td>&gt; or = 2mm</td>
<td>&gt; or = 2mm</td>
<td>&gt; or = 2mm</td>
</tr>
<tr>
<td>Base radius (r)</td>
<td>&gt; 0.6t</td>
<td>&gt; 0.6t</td>
<td>&gt; 0.6t</td>
</tr>
<tr>
<td>Preferred screw type</td>
<td>BT thread cutting</td>
<td>BT thread cutting</td>
<td>BT thread cutting</td>
</tr>
</tbody>
</table>

Snap-fit assemblies must be designed within the elastic limitations of the materials employed. The following formulas may be used to estimate the percent deformation of Plexiglas acrylic resin for a given design.

For Cantilever: $e = \frac{d}{(0.67 \times \frac{l^2}{h})}$

For Bush Fit: $e = \frac{(d_1-d_2)}{d_1} \times 100$

β angle range for a dismountable system = 40-50°

β angle range for an non-dismountable system > or = 50°

α angle should be between 20° and 30°

### Snap Fits Design Guidelines For Plexiglas Acrylic Resins

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<table>
<thead>
<tr>
<th>Permissible Deformation (e)</th>
<th>2%</th>
<th>3-4%</th>
<th>4-5%</th>
</tr>
</thead>
</table>

Plexiglas V-Series  Plexiglas MI7  Plexiglas DR