3D HUBS

CNC Manufacturing Standards

v 2.4- as communicated to our Manufacturing Partners
# CNC Manufacturing standards

<table>
<thead>
<tr>
<th>Part size / Dimension</th>
<th>Tolerance</th>
<th>Angularity</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 300 mm (12&quot;)</td>
<td>± 0.125 mm (± 0.005&quot;)</td>
<td>± 0.5°</td>
</tr>
<tr>
<td>&lt; 600 mm (24&quot;)</td>
<td>± 0.250 mm (± 0.010&quot;)</td>
<td>± 1.0°</td>
</tr>
<tr>
<td>&lt; 900 mm (36&quot;)</td>
<td>± 0.400 mm (± 1/64&quot;)</td>
<td>± 1°</td>
</tr>
<tr>
<td>&lt; 1500 mm (60&quot;)</td>
<td>± 0.8 mm (± 1/32&quot;)</td>
<td>± 1°</td>
</tr>
<tr>
<td>&gt; 1500 mm (60&quot;)</td>
<td>± 1.6 mm (± 1/16&quot;)</td>
<td>± 1°</td>
</tr>
</tbody>
</table>

Standard order surface finish shall be referred to as As Machined and requires a ~125 RA µin (3.2 RA µm) finish. Minor tool marks visible on the part are acceptable. All sharp edges and burrs will be removed. If any form of threads (internal or external), any non-standard tolerances or any non-standard surface finish are required, these must be clearly indicated in a technical drawing.

## 6.2.1 Threads and tolerance specifications

The purchase order will indicate whether threads or tolerances are included in an order. The Manufacturing Partner must receive a technical drawing that clearly defines the specifications for these features. Threads and tolerances must ONLY be included on a part when a technical drawing has been provided.

By accepting an order, the Manufacturing Partner indicates that they have reviewed all technical drawings and have acknowledged the presence of threads or tolerances. 3D Hubs is not responsible for informing the Manufacturing Partner that threads or tolerances are present.

### Threads

All threads shall be cut straight and cleaned with any chips removed. All threads must be checked to confirm functionality.

### Tolerances
6.2.2 Surface finishes

3D Hubs offers customers a number of surface finish options. Manufacturing Partners must NOT apply any surface finishes (including but not limited to sanding or grinding) without confirmation from 3D Hubs in the Purchase Order to do so. This does not include the removal or sharp edges or burrs. When surface finishes are required, threaded or tolerance areas must be masked so that the finish does not affect the function of the part.

For surface finishes other than As Machined the following quality standards must be met:

Bead blasting
A matte finish with a light texture and consistent surface. Bead blasting should only be used when it does not damage part geometry or features.

Anodized
An anodized Type II surface finish as per ISO 7583:2013. The surface must be smooth and consistent with no marks or scratches. 3D Hubs will provide the Manufacturing Partner with a Pantone or RAL color unless the finish is black or clear.

Powder coating
The surface must be smooth and consistent with no marks or scratches. 3D Hubs will provide the Manufacturing Partner with a Pantone or RAL color unless the finish is black.