

**Inspection & Testing**

TITLE:

**GENERAL TOLERANCES**

## 1. Scope


1.1. This document defines the standard dimensional tolerances used at Flowguard.

## 2. Reference Documents

2.1. None

## 3. Machining Tolerances

	Detail	Tolerance
3.1.	Number of decimal places	<ul style="list-style-type: none"><li>• Zero decimal places - <math>\pm 1\text{mm}</math></li><li>• One decimal places - <math>\pm 0.2\text{mm}</math></li><li>• Two decimal places - <math>\pm 0.05\text{mm}</math></li><li>• Three decimal places - <math>\pm 0.025\text{mm}</math></li></ul>
3.2.	Holes	<ul style="list-style-type: none"><li>• Bolt holes <math>+1\text{mm}/-0\text{mm}</math></li><li>• Flow ports <math>+0\text{mm}/-1\text{mm}</math></li><li>• Pipe Threads (G Series)</li></ul>
3.3.	Screw Cut Threads	<ul style="list-style-type: none"><li>• To Thread Gauge</li><li>• To fitting if thread gauge not available</li><li>• 5mm Undercut allowed on manual lathe</li></ul>
3.4.	Shells made from unmachined tube	<ul style="list-style-type: none"><li>• Shell outside diameter according to code requirements, otherwise <math>+1.5,-0.75\text{mm}</math></li><li>• Shell wall thickness according to code requirements, otherwise <math>\pm 12.5\%</math> of nominal wall thickness.</li></ul>
3.5.	Machine bores in shells	<ul style="list-style-type: none"><li>• "O" Ring sealing <math>+0.05\text{mm}</math> to <math>0.10\text{mm}</math></li><li>• Mating male O.D.'s <math>-0.1\text{mm}</math> to <math>-0.5\text{mm}</math></li><li>• "O" Ring groove depth <math>\pm 0.1\text{mm}</math></li><li>• "O" Ring groove width <math>\pm 0.15\text{mm}</math></li></ul>
3.6.	Shell lengths	<ul style="list-style-type: none"><li>• Internal <math>\pm 2\text{mm}</math></li><li>• Overall <math>\pm 2\text{mm}</math></li><li>• Distance to port centre line <math>\pm 5\text{mm}</math></li><li>• Distance between port centre line <math>\pm 3\text{mm}</math></li></ul>

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#### 4. Fabrication Tolerances

	Detail	Tolerance
4.1.	Number of decimal places	<ul style="list-style-type: none"> <li>• Zero decimal places <math>\pm 3\text{mm}</math></li> </ul>
4.2.	Alignment of nozzle flange	<ul style="list-style-type: none"> <li>• Maximum 0.5% in any direction</li> </ul>
4.3.	Radical orientation	<ul style="list-style-type: none"> <li>• From reference centre line to centre line of nozzle</li> <li>• Face with normal vessel centre line</li> <li>• A maximum circumferential tolerance of <math>\pm 3\text{mm}</math></li> </ul>
4.4.	Bolt hole orientation	<ul style="list-style-type: none"> <li>• Maximum rotation 1.5mm measured at bolt circle</li> <li>• NB: Bolt holes to straddle centre lines, unless otherwise stated</li> </ul>
4.5.	Deviation of nozzle centre line	<ul style="list-style-type: none"> <li>• Not to exceed 3mm</li> </ul>
4.6.	Permissible out of roundness	<ul style="list-style-type: none"> <li>• Applies to cylindrical, conical and spherical shells</li> <li>• For cylindrical, conical and spherical shells the difference between the maximum and minimum inside diameters at any cross section not to exceed 1%</li> </ul>

#### 5. Approvals

Prepared By: G. Lowndes Title: Senior Design Engineer Date: 30 June 06

Reviewed By: A. Hay Title: Works Manager Date: 05 July 07

Approved By: A. Hay Title: Works Manager Date: 05 July 07