

Document title: Cylindricity

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Page loaded at (UTC): Tue, 08 Jul 2025 18:59:58 GMT

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Capture tool: 10.57.0

Collection server IP: 54.145.42.72

Browser engine: Mozilla/5.0 (X11; Linux x86_64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/138.0.7204.97 Safari/537.36

Operating system: Linux (Node 22.17.0)

PDF length: 4

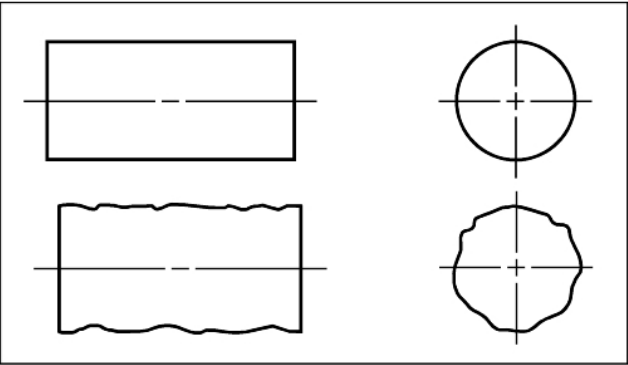
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GD&T - CYLINDRICITY 'CIRCLE 1'

INTRODUCTION

Consider the two cylinders shown. Which cylinder is perfectly circular? In reality, no cylindrical part is perfect. How would we know if the cylinder on the bottom is cylindrical enough?

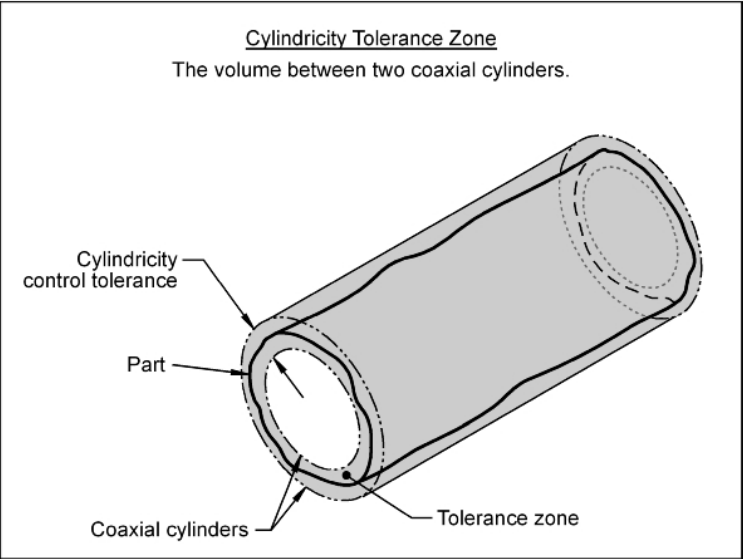
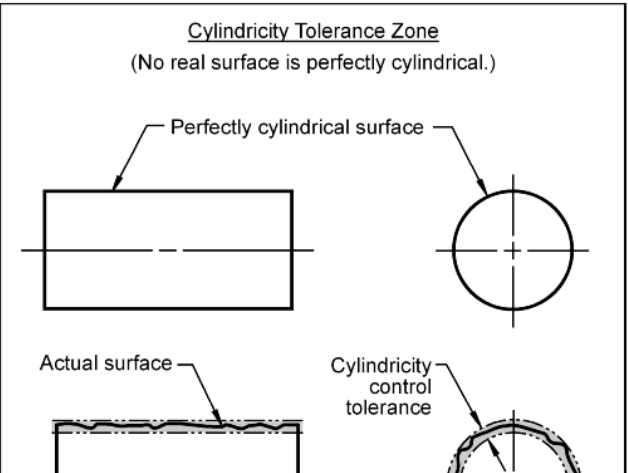


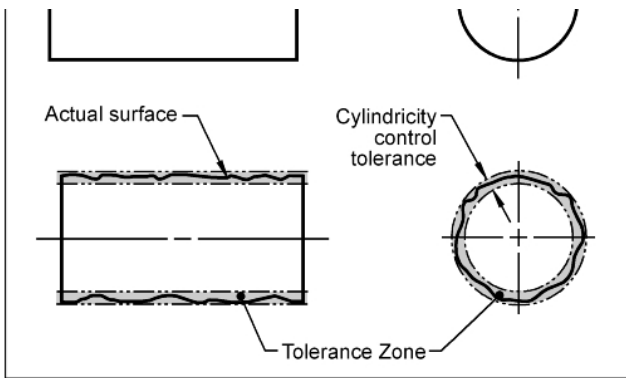
CYLINDRICITY CONTROL

The **cylindricity control (g)** defines how much a cylindrical surface of a part may deviate from a perfect cylinder.

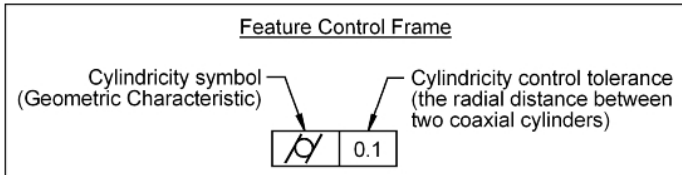
Cylindricity Control: Perfect **cylindricity** is when all points of a **surface of revolution** are the same distance away from a common axis. Cylindricity is a **form** control. The **cylindricity control (g)** defines how much a cylindrical surface on a real part may vary from an ideal cylinder that is perfectly round, perfectly straight and has no taper.

Tolerance Zone: The **cylindricity tolerance zone** is the volume between two coaxial cylinders. The radial distance between the two cylinders is the value of the **cylindricity control tolerance**. The surface being controlled must lie within the volume defined by the **tolerance zone**.

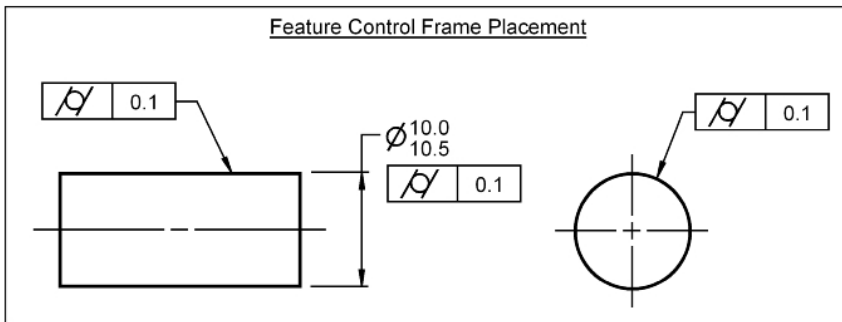




Feature Control Frame: To control the cylindricity of a surface, a **feature control frame** (FCF) is used to apply the tolerance to the desired surface.



To apply the cylindricity control to a surface, the FCF may point to the surface in either the circular or rectangular view. The FCF shown below applies a cylindricity tolerance to the entire surface. This surface must lie between two coaxial cylinders whose radial separation is 0.1 mm.



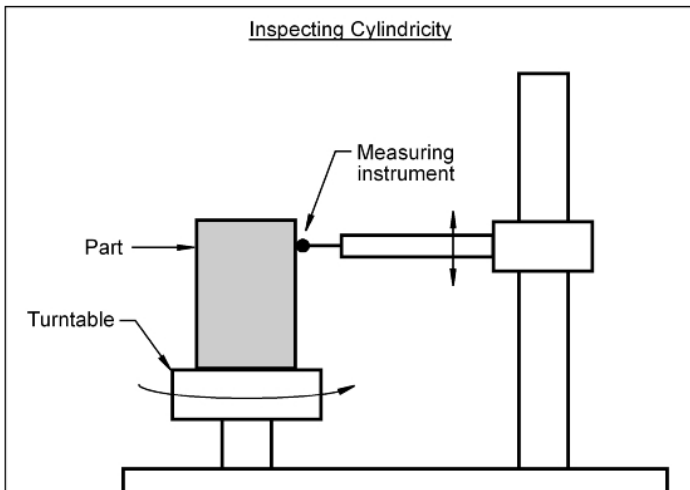
USES

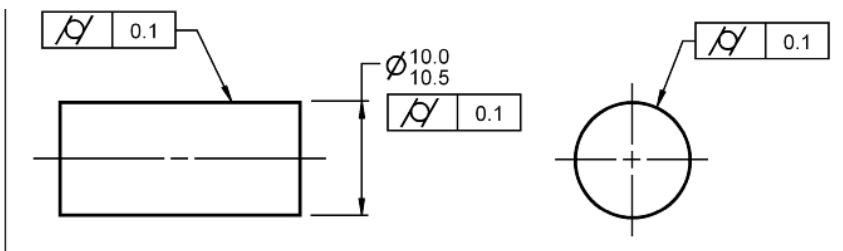
The cylindricity control is used to limit 'out of roundness', 'taper' and to ensure straightness of a shaft. If a shaft has too much cylindrical error, it could cause bushing or bearing failure. It can also protect against any large pits or bumps.

INSPECTION

The cylindricity control may be inspected as follows:

1. The part is placed on a turntable.
2. A measuring instrument contacts the part at the circular element to be measured.
3. As the part is rotated, the measuring instrument must up or down the part and the profile of the cylinder is captured.
4. The profile data may be plotted on a polar graph or analyzed using a computer algorithm to determine if this particular circular element is within specifications.
5. The difficulty that arises when checking cylindricity is the ability to find and stabilize the features axis.





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