

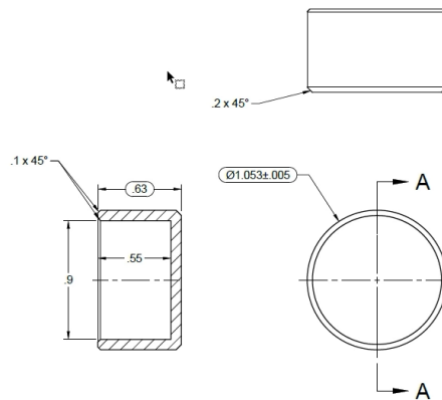
Step-by-step guide

Blueprint reading: Dimensions and tolerance

Explore and understand information on a drawing sheet in preparation for manufacturing a part.

Learning objectives:

- Identify dimension types.
- Interpret dimensional tolerances.



The completed exercise

1. Open the supplied *Precision Machining Caliper - INCH Drawing.pdf* file. This drawing depicts the brake caliper that will be the basis for the course project. Explore each of the five drawing sheets and notice the types of information on each sheet.

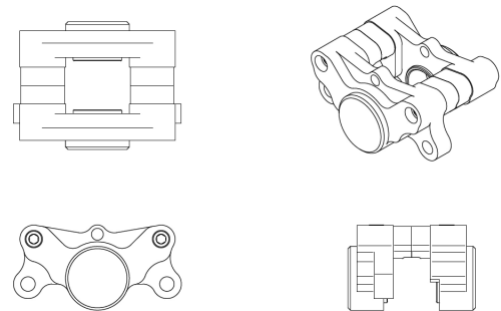


Figure 1. Open the supplied file

2. Navigate to the second sheet and notice the exploded assembly. This exploded view shows the three different components that you will be making. The assembly has two of the piston bodies, one front caliper, and one rear caliper.

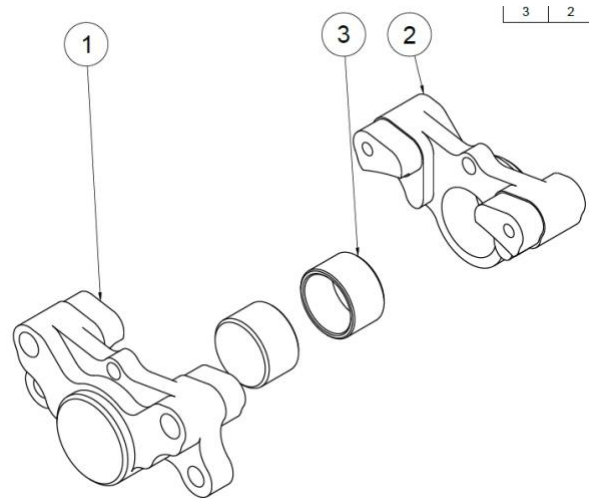


Figure 2. Navigate to Sheet 2

3. Navigate to Sheet 3 and notice that the caliper is displayed using several different views: a front view, a top view, a side view, an isometric view, and a couple section views. Some of the drawing dimensions have a balloon around them. These dimensions are intended to be inspected after the part is manufactured. Validating this measurement is a critical step to ensure that the part is machined correctly.

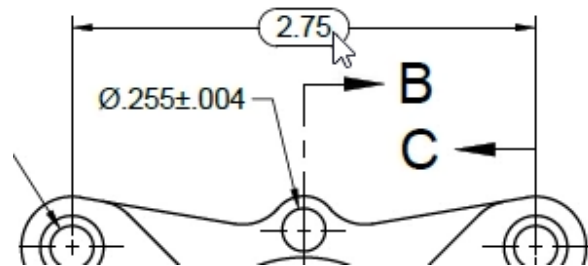


Figure 3. Explore the drawing information

4. Also notice that some of the dimensions have tolerance values listed beside them. In the image on the right, the piston bore can be 0.005" larger than the indicated measurement.

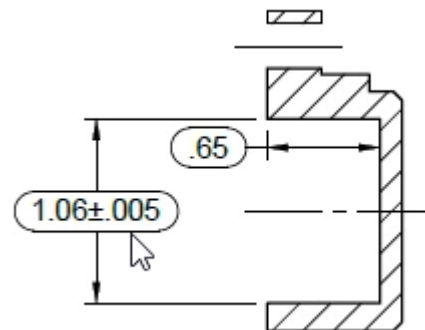


Figure 4. Continue exploring the drawing information

- The information shown in the image on the right shows two different diameter dimensions, which indicates a counter bored feature.

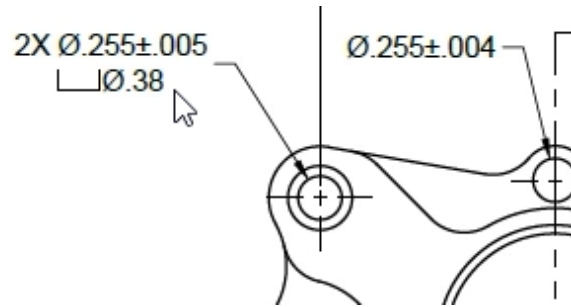


Figure 5. Continue exploring the drawing information

- Some of the drawing dimensions do not have a tolerance listed next to them. The title block information determines the default tolerance for these measurements.



Figure 6. Inspect the drawing title block

- Continue to Sheet 4 and notice the information pointing to the tapped hole of the caliper. This hole is intended to be tapped with a $\frac{1}{4}$ - 20 coarse thread tap and have a class 2B fit. The threads need to plunge 0.44" into the caliper.

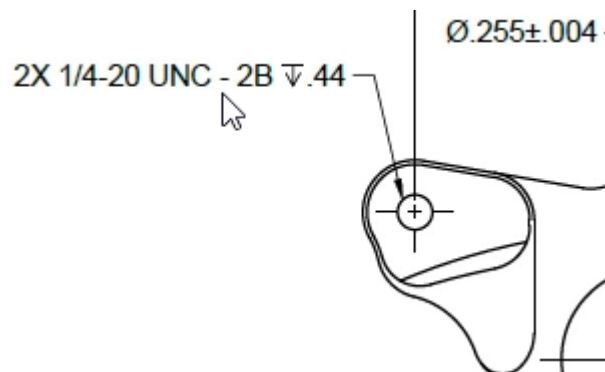


Figure 7. Inspect the threaded hole information

8. Continue to Sheet 5 and note the chamfer dimensions. It is important to understand information on the drawing before machining a part; if there is any information that needs clarification, you should contact the creator of the drawing and make sure you agree on the information. The 0.1 dimension shown in the image on the right is likely a typo because it is too large for the piston.

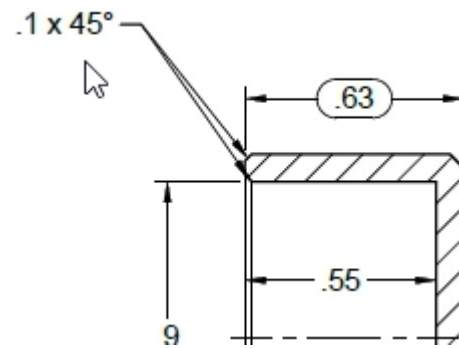


Figure 8. Inspect the piston dimensions

9. Inspect the title block-Sheet 5 and notice that the Approved box does not have initials. This sheet might not have been approved before you received it. Save the file.

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCE: .X = ±0.050 .XX = ±0.050 .XXX = ±0.010 ANGULAR = ±1°		Precision AUTOCAD	
MATERIAL	Aluminum 6061	SIZE	
APPROVED		B	
DRAWN	MP	9/7/2022	SCALE 2:1

Figure 9. Inspect the title block