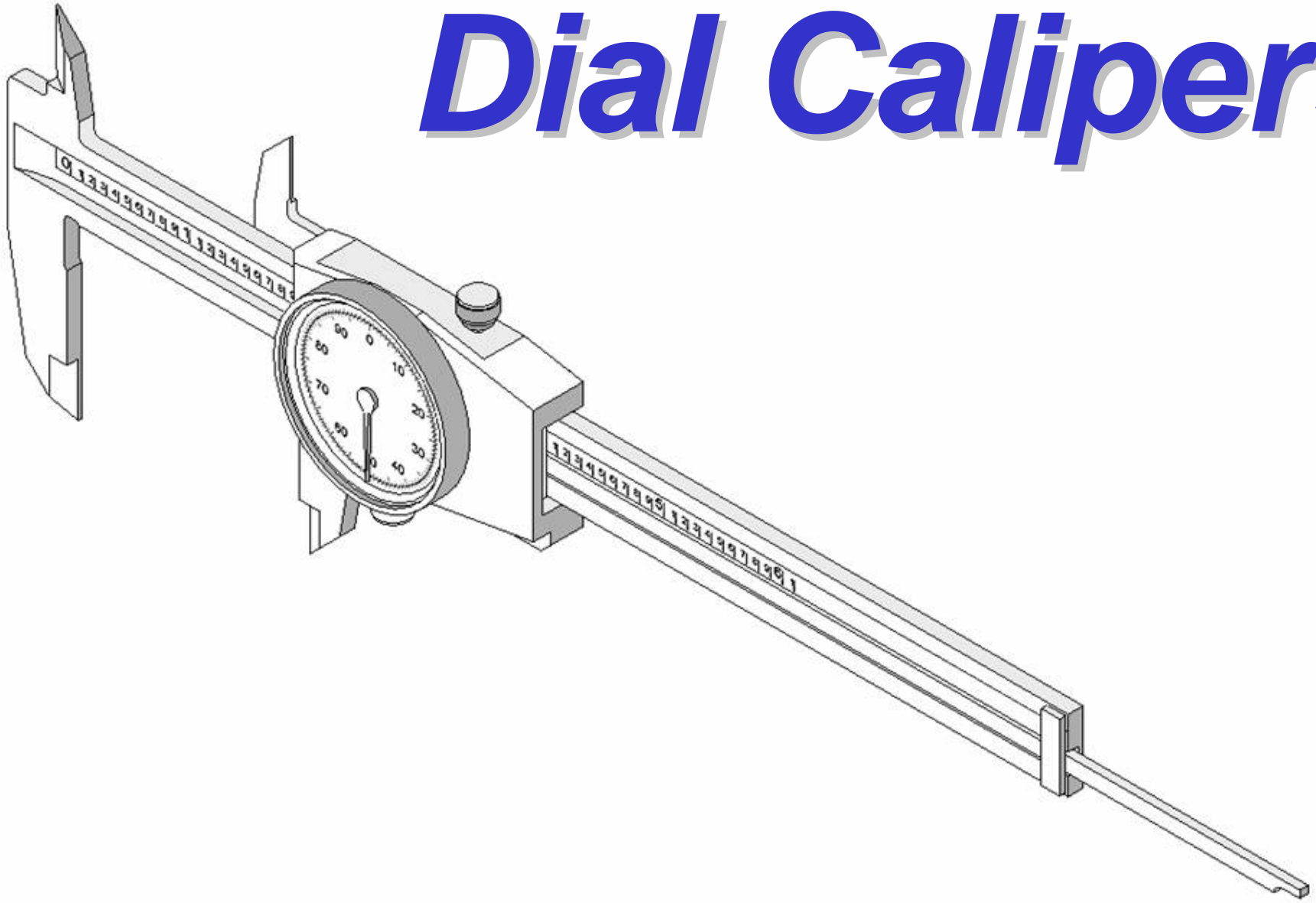




*Forging new generations of engineers*

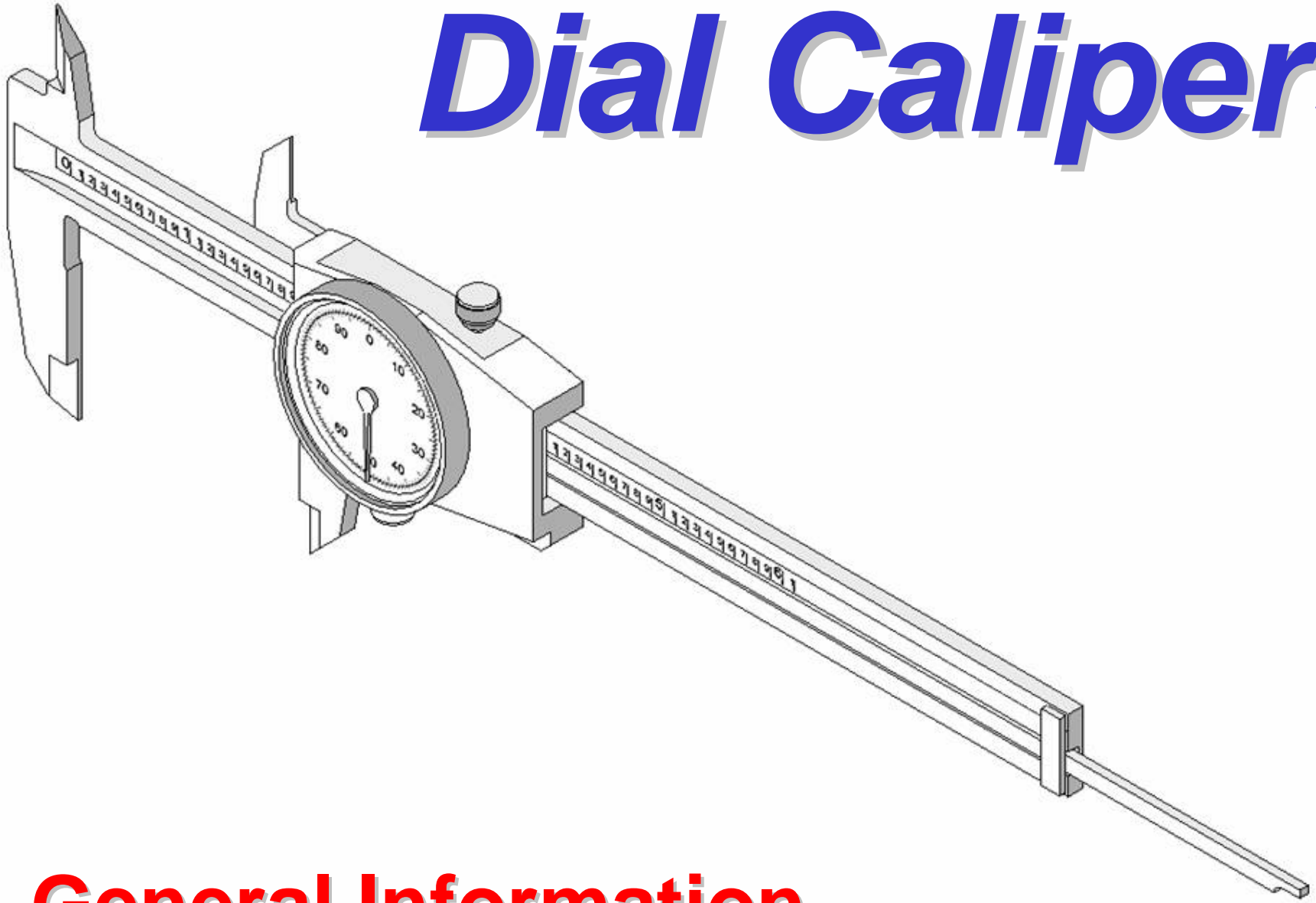
# *Dial Calipers*



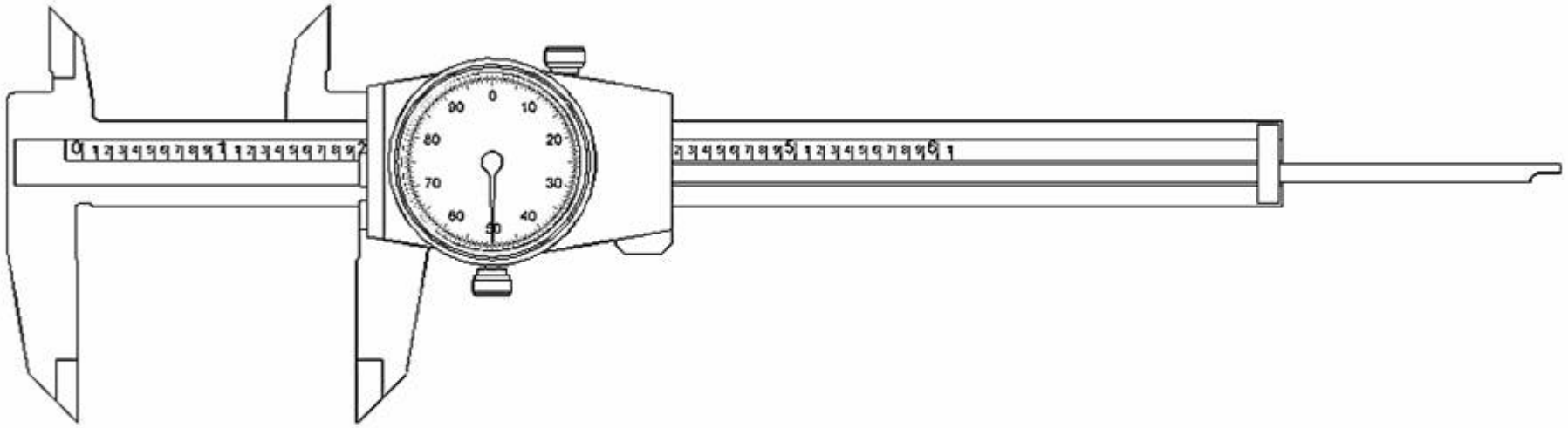
At the conclusion of this presentation, you will be able to...

- identify four types of measurements that dial calipers can perform.
- identify the different parts of a dial caliper.
- accurately read an inch dial caliper.

# *Dial Calipers*

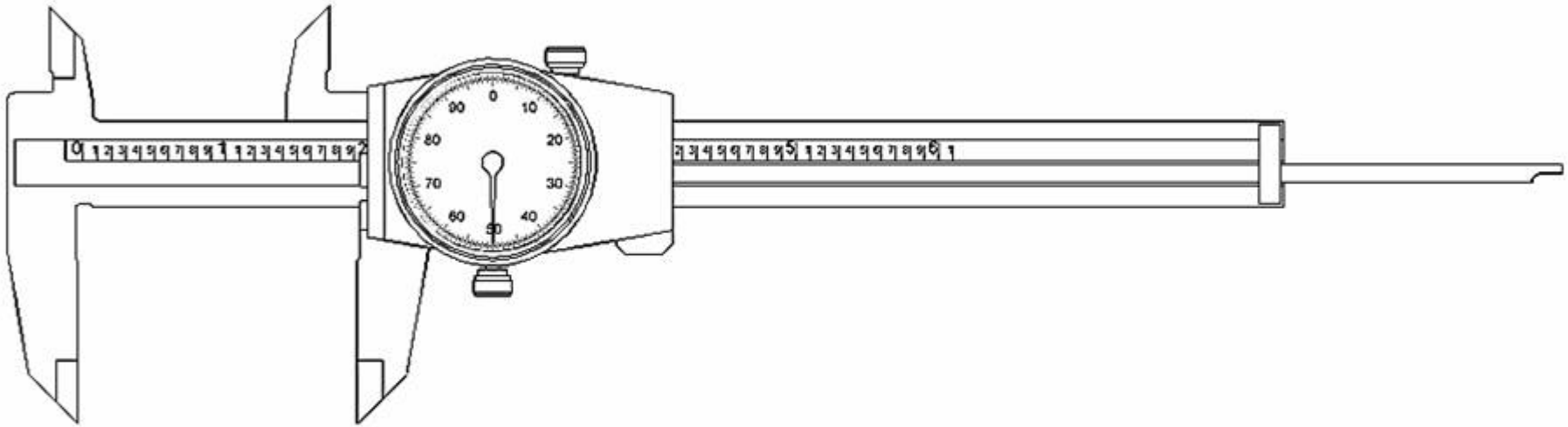


## **General Information**



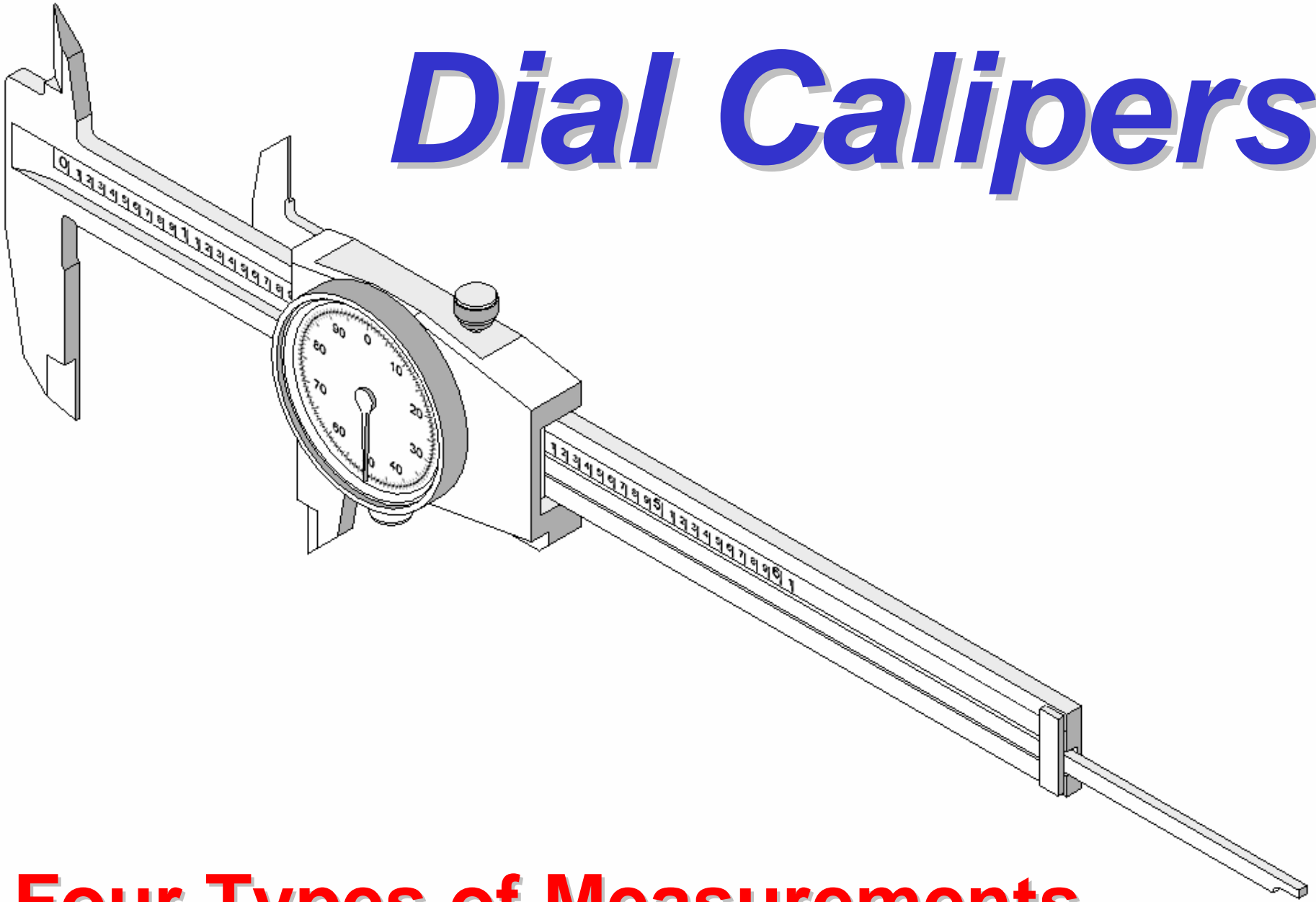
*Dial Calipers* are arguably the most common and versatile of all the precision measuring tools.

Engineers, technicians, scientists and machinists use precision measurement tools every day for:

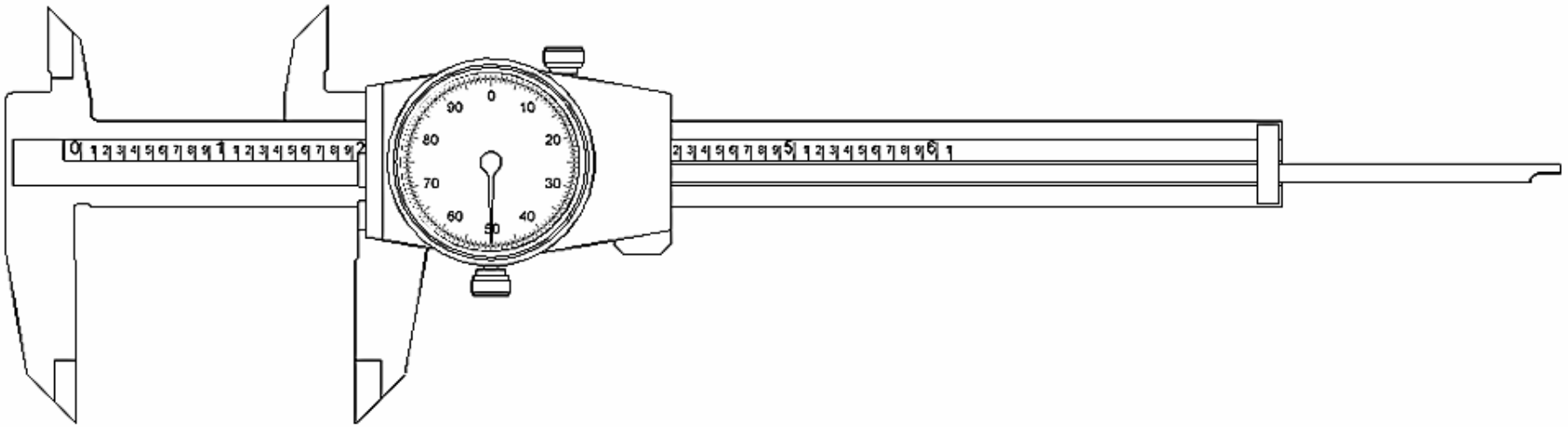


- *analysis*
- *inspection*
- *engineering design*
- *reverse engineering*
- *manufacturing*

# *Dial Calipers*

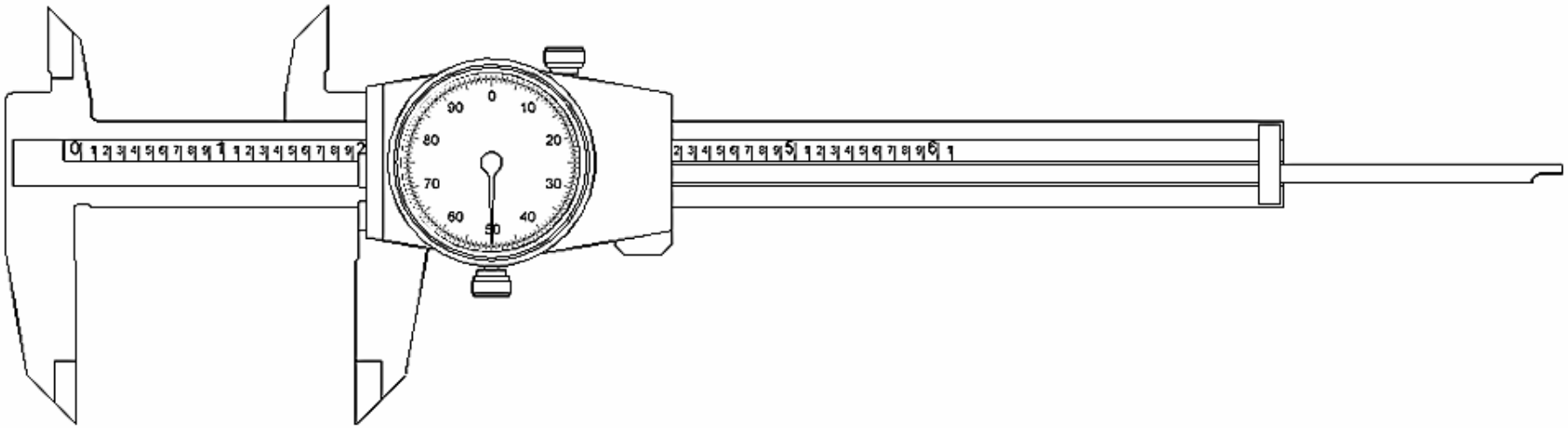


**Four Types of Measurements**

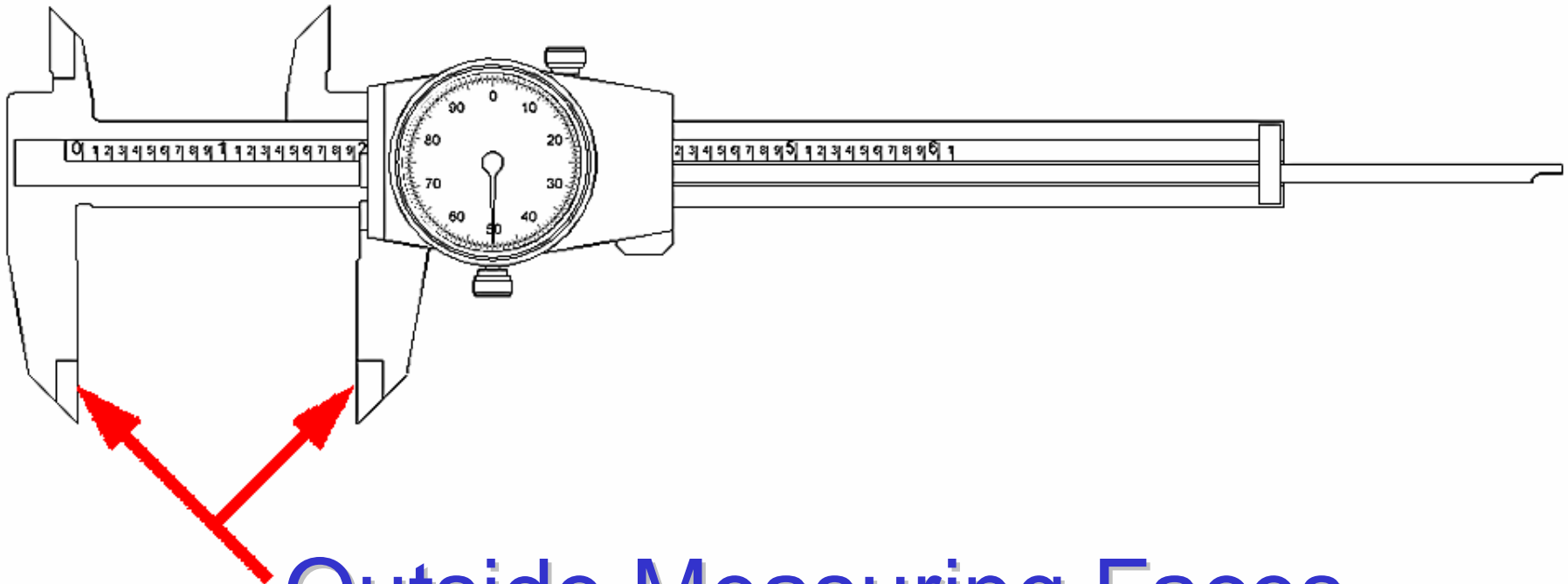


Dial calipers are used to perform four common measurements on parts...



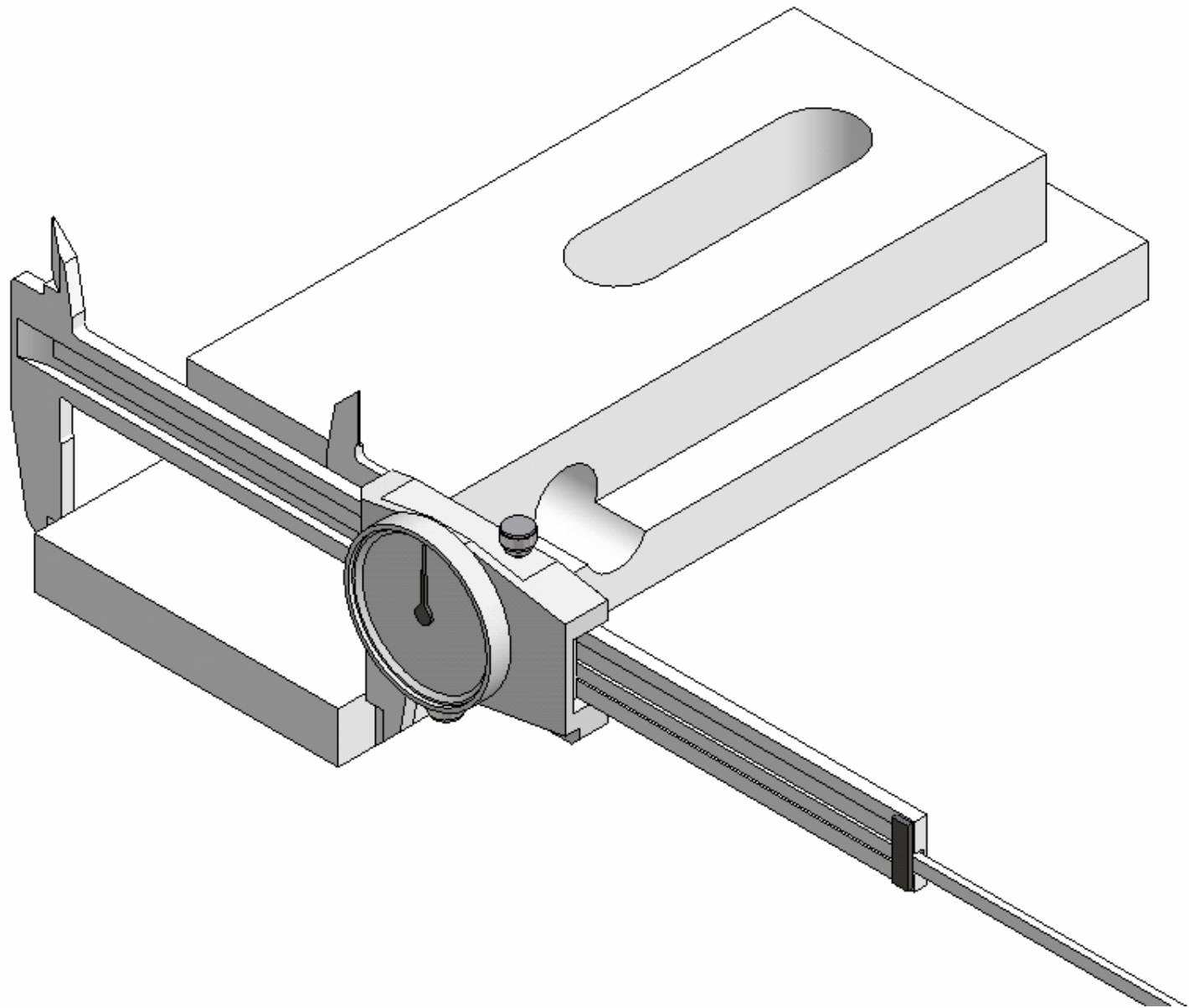


1. Outside Diameter/Object Thickness
2. Inside Diameter/Space Width
3. Step Distance
4. Hole Depth

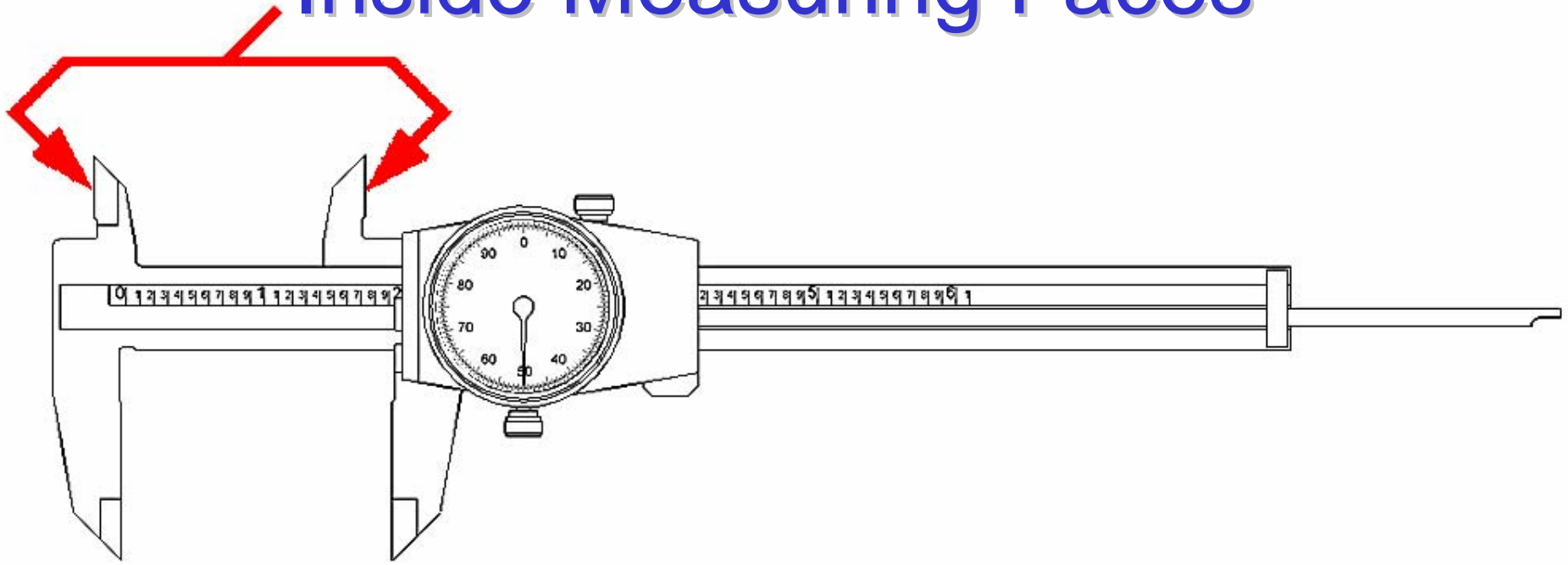


## Outside Measuring Faces

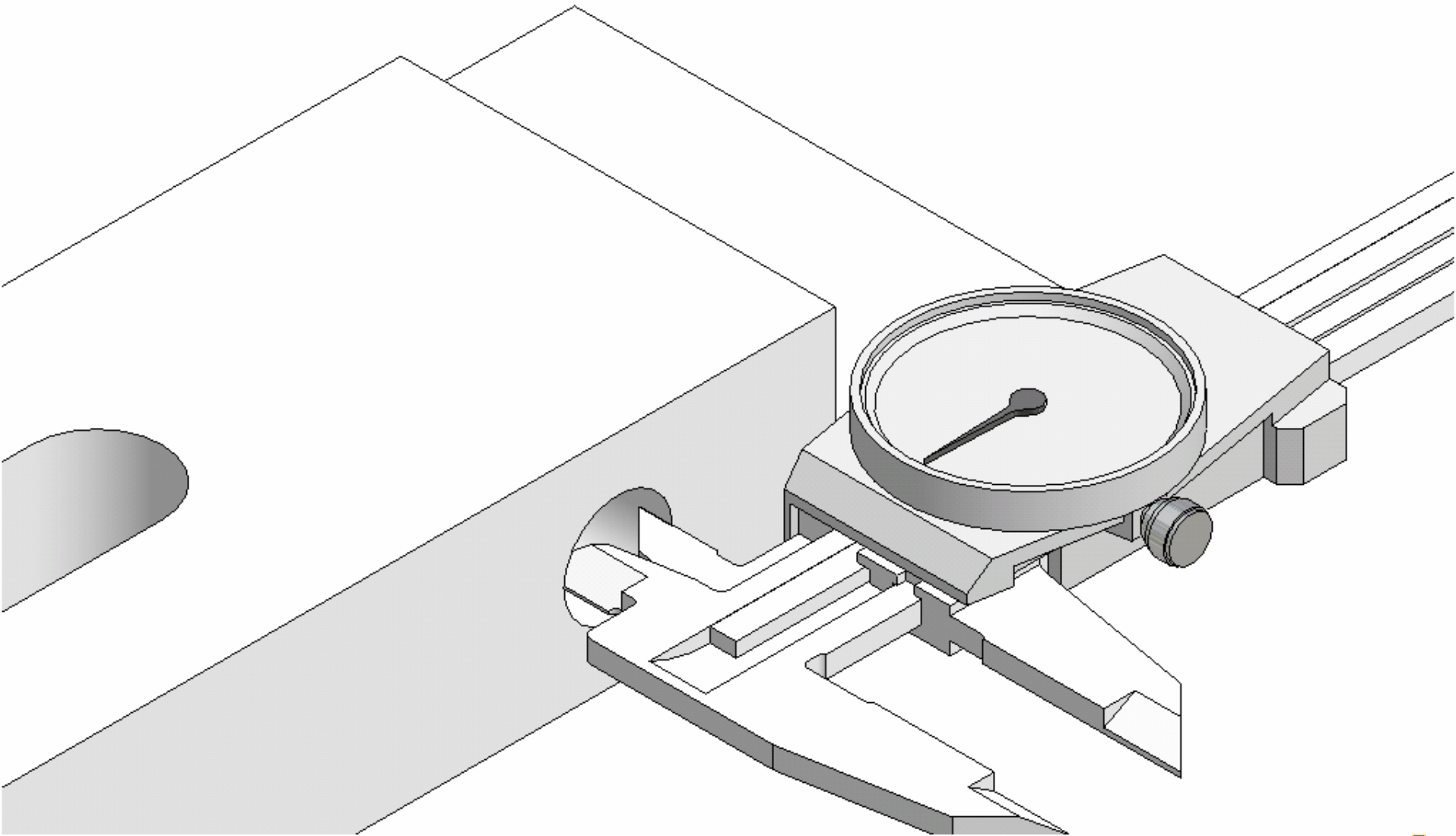
These are the faces between which outside length or diameter is measured.



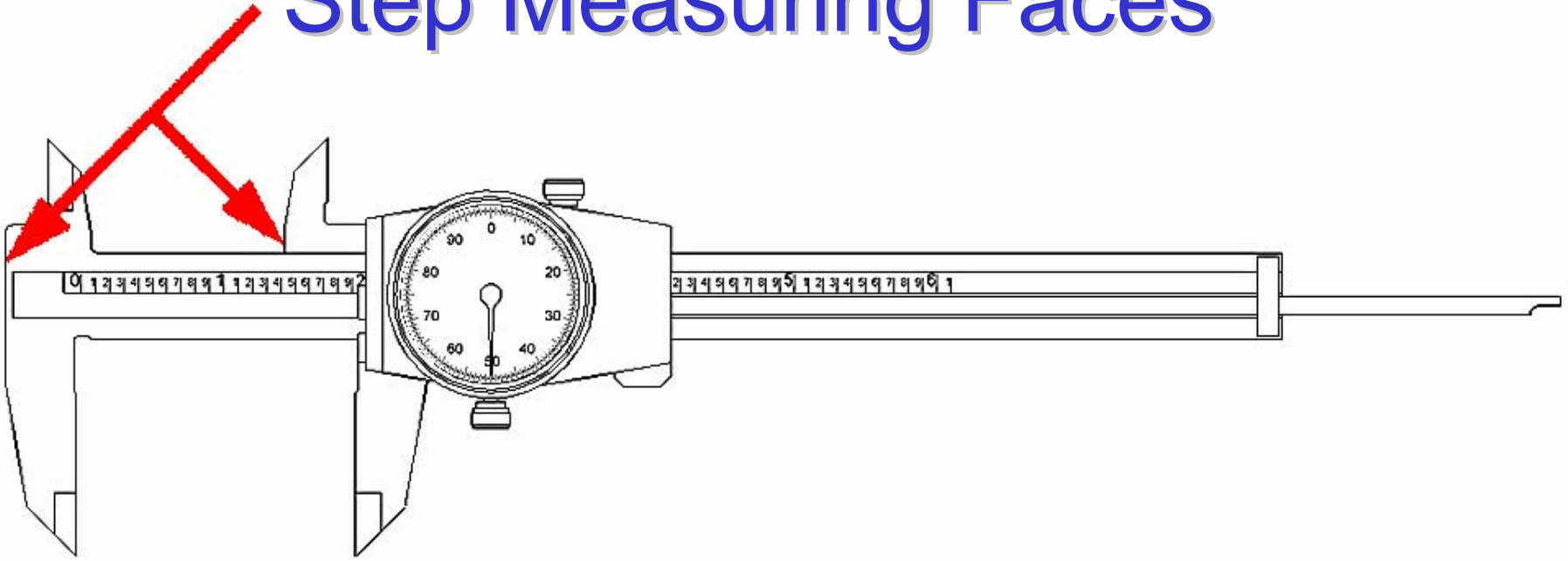
# Inside Measuring Faces



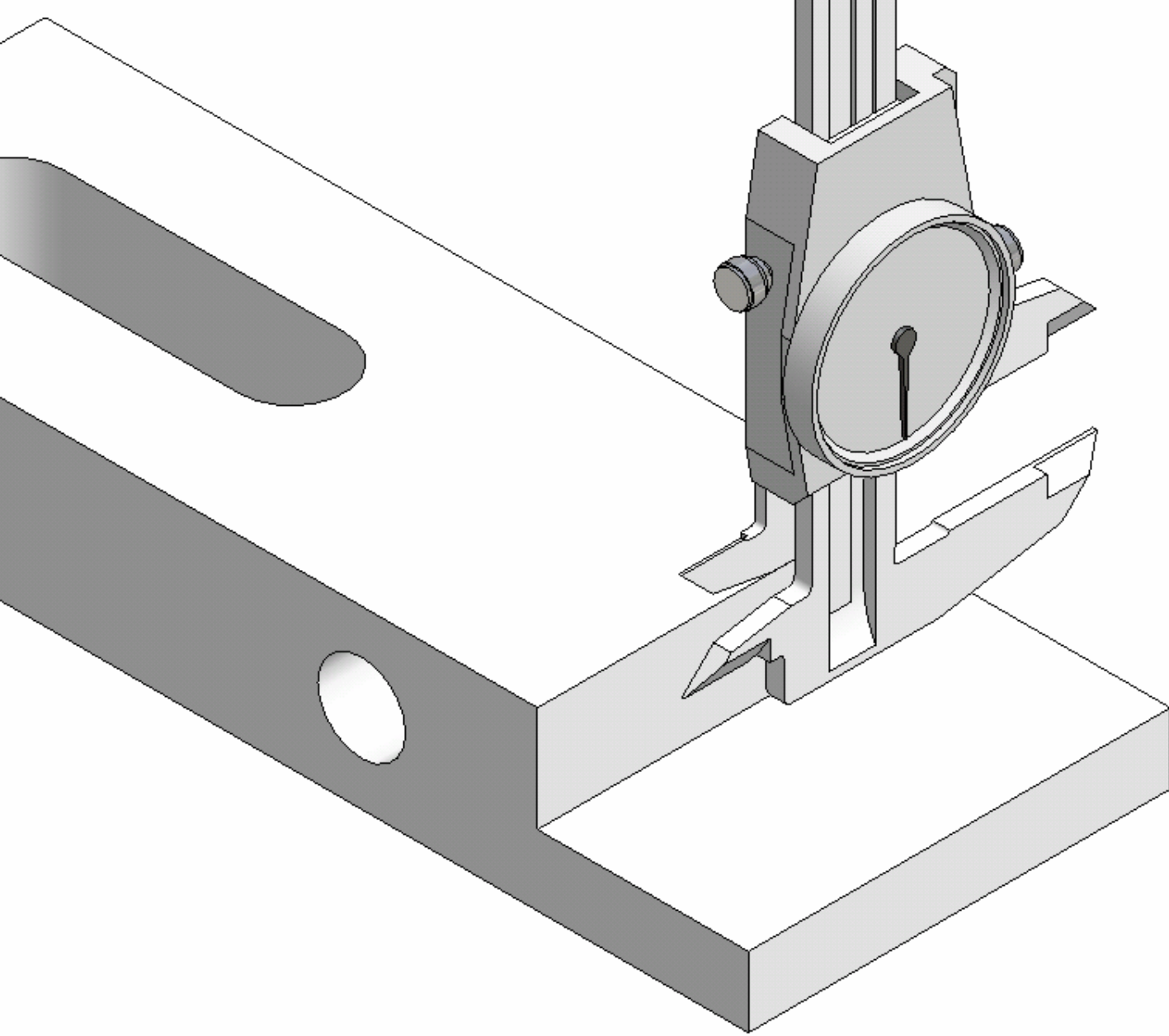
These are the faces between which inside diameter or space width (i.e., slot width) is measured.



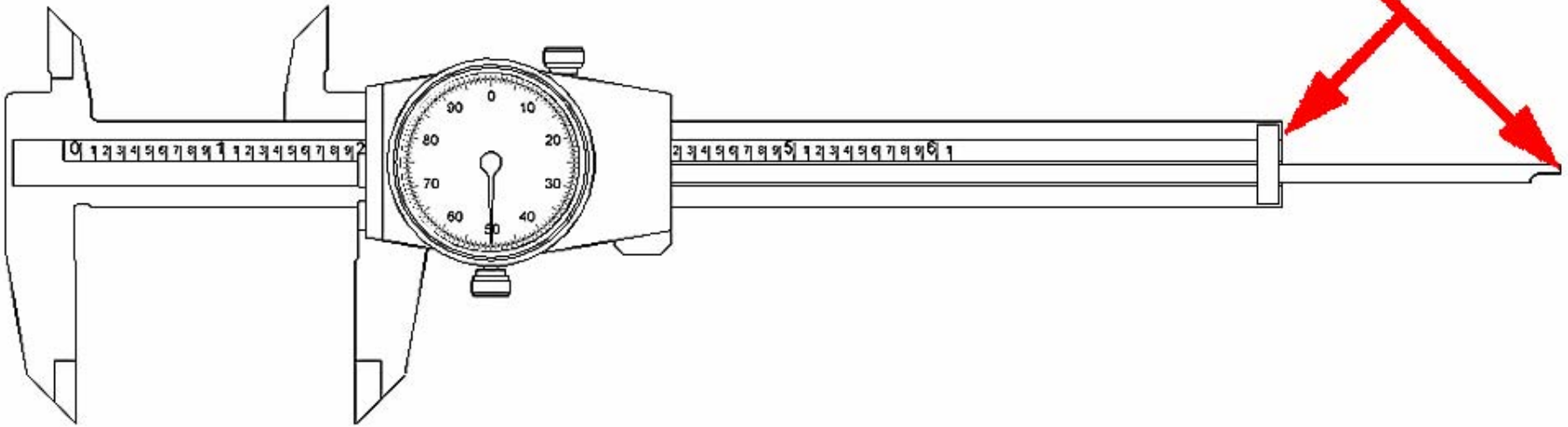
# Step Measuring Faces



These are the faces between which stepped parallel surface distance can be measured.

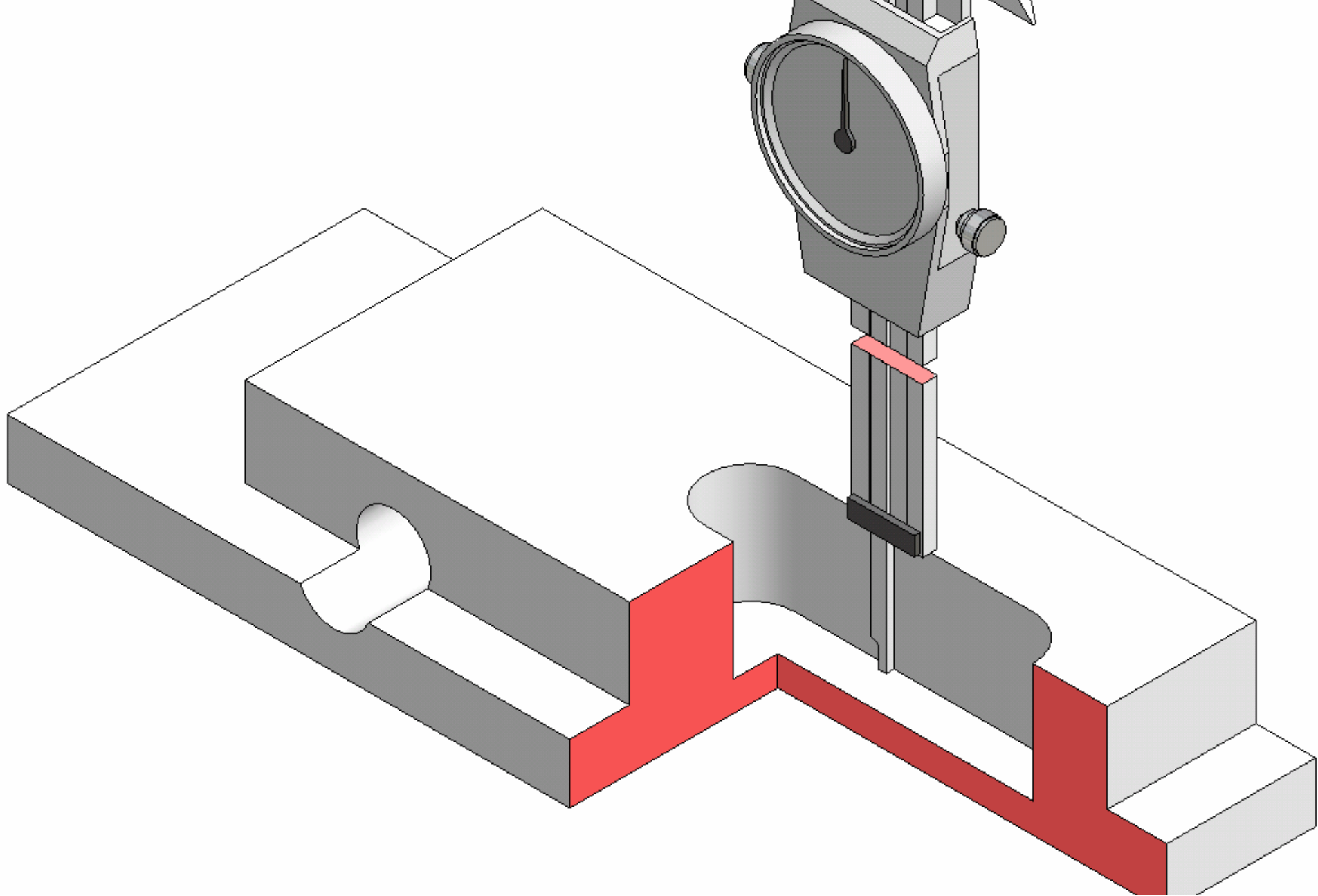


# Depth Measuring Faces



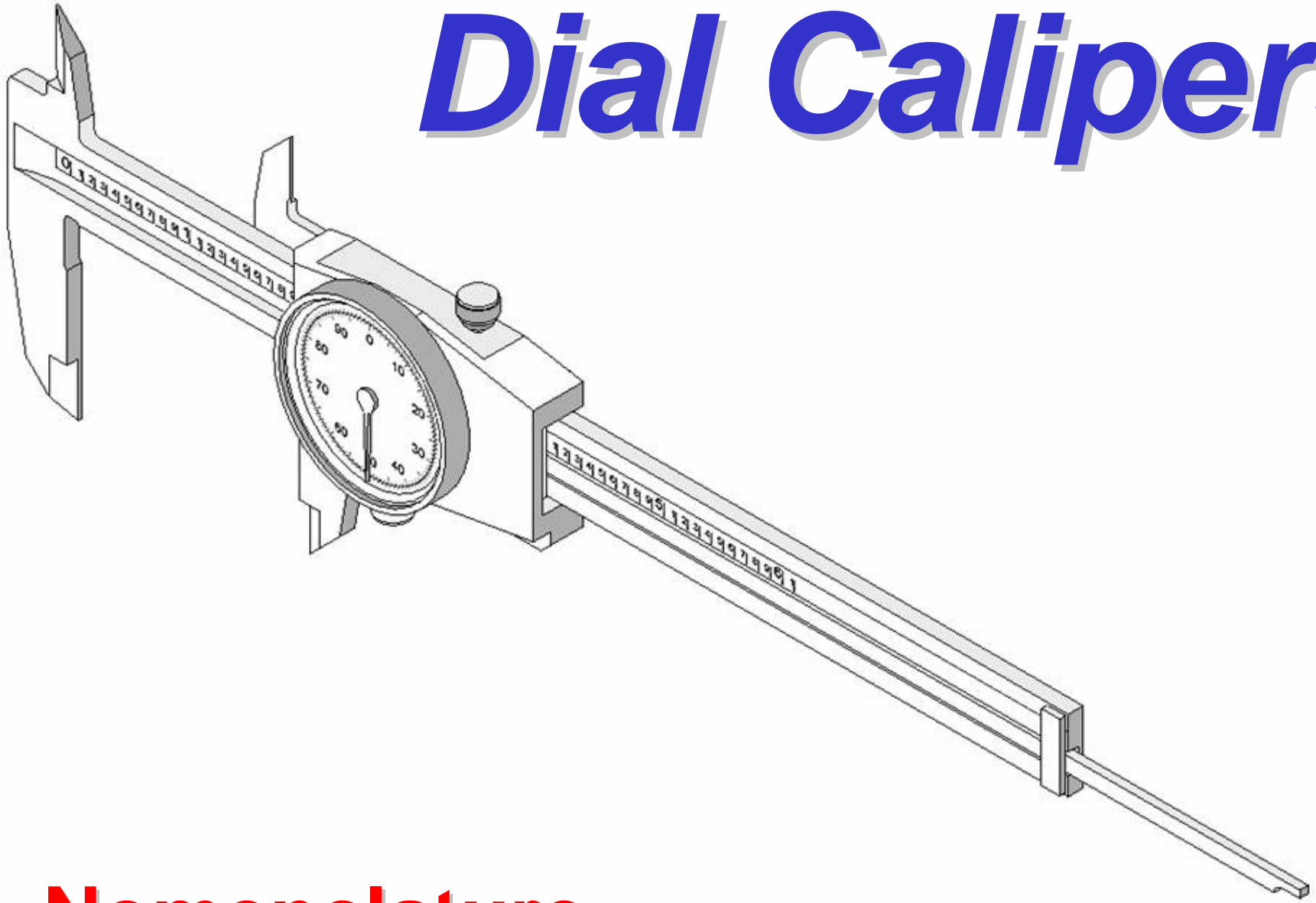
These are the faces between which the depth of a hole can be measured.



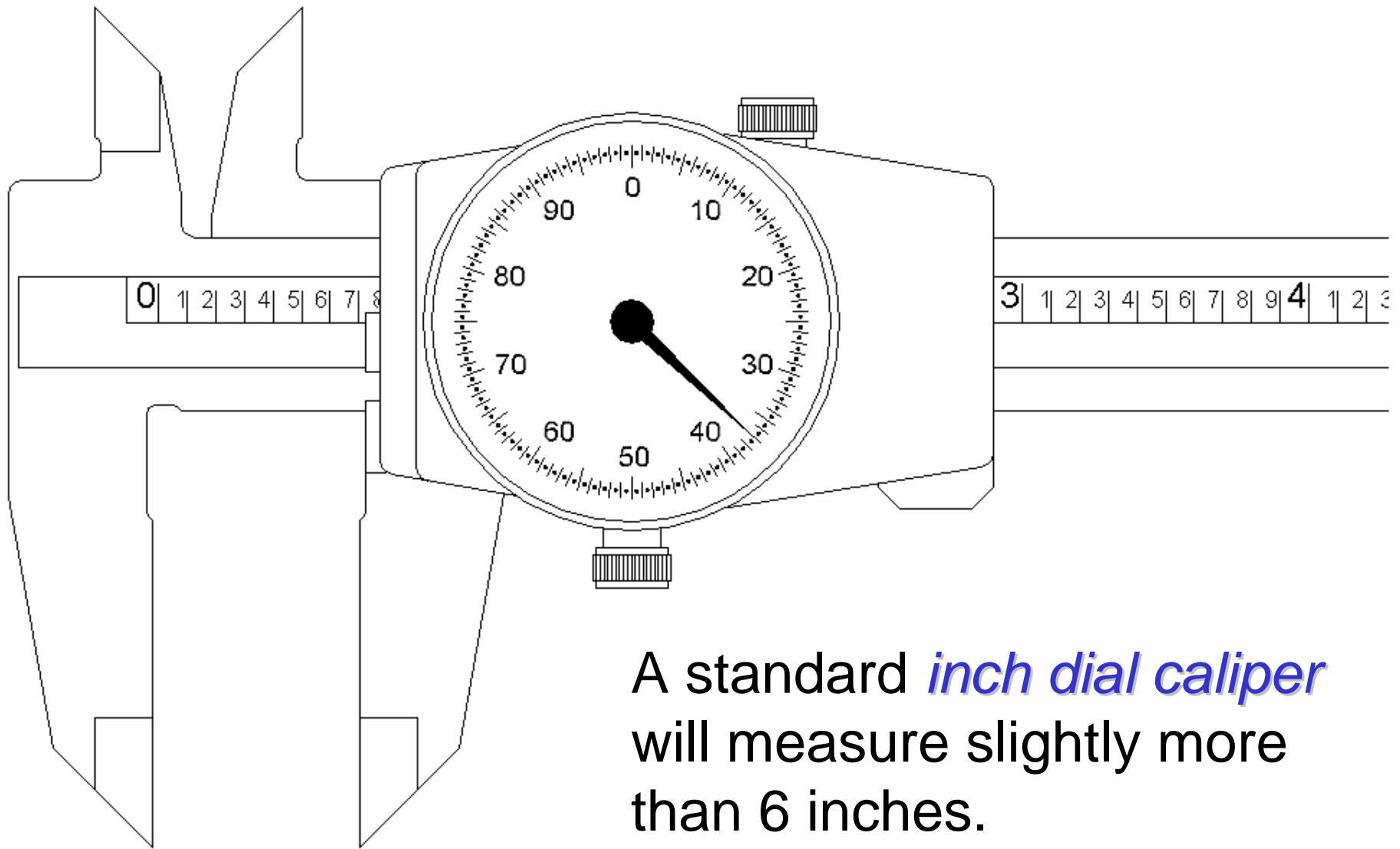


*Note: Work piece is shown in section. Dial Caliper shortened for graphic purposes*

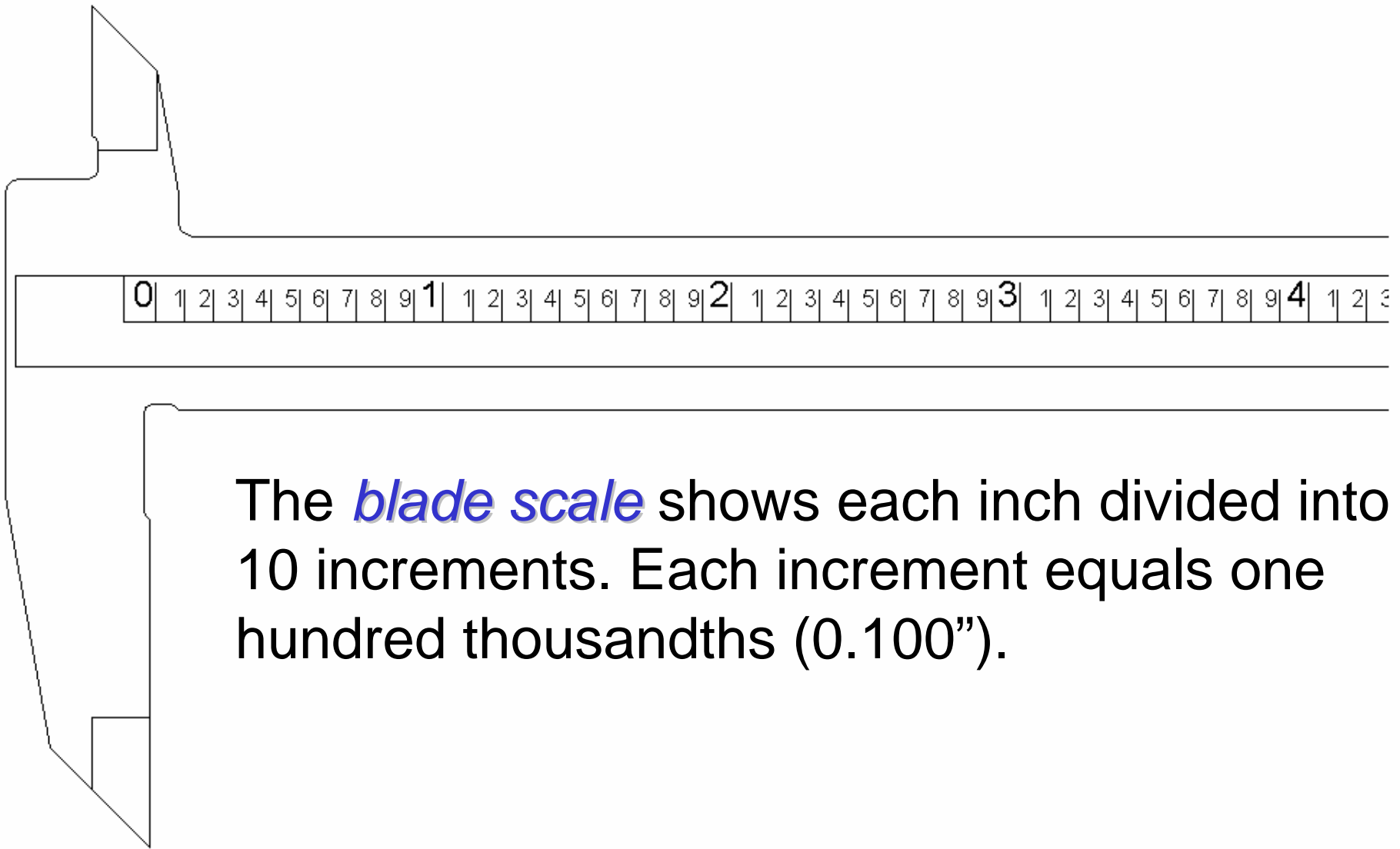
# *Dial Calipers*



**Nomenclature**

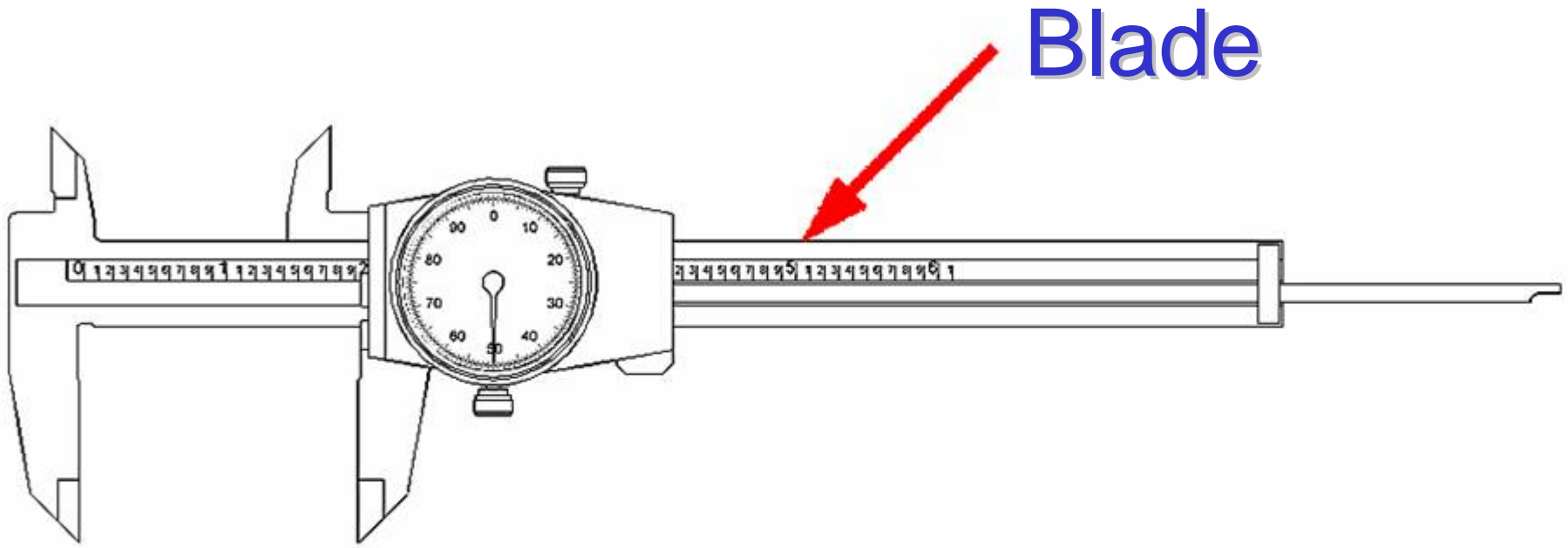


A standard *inch dial caliper* will measure slightly more than 6 inches.

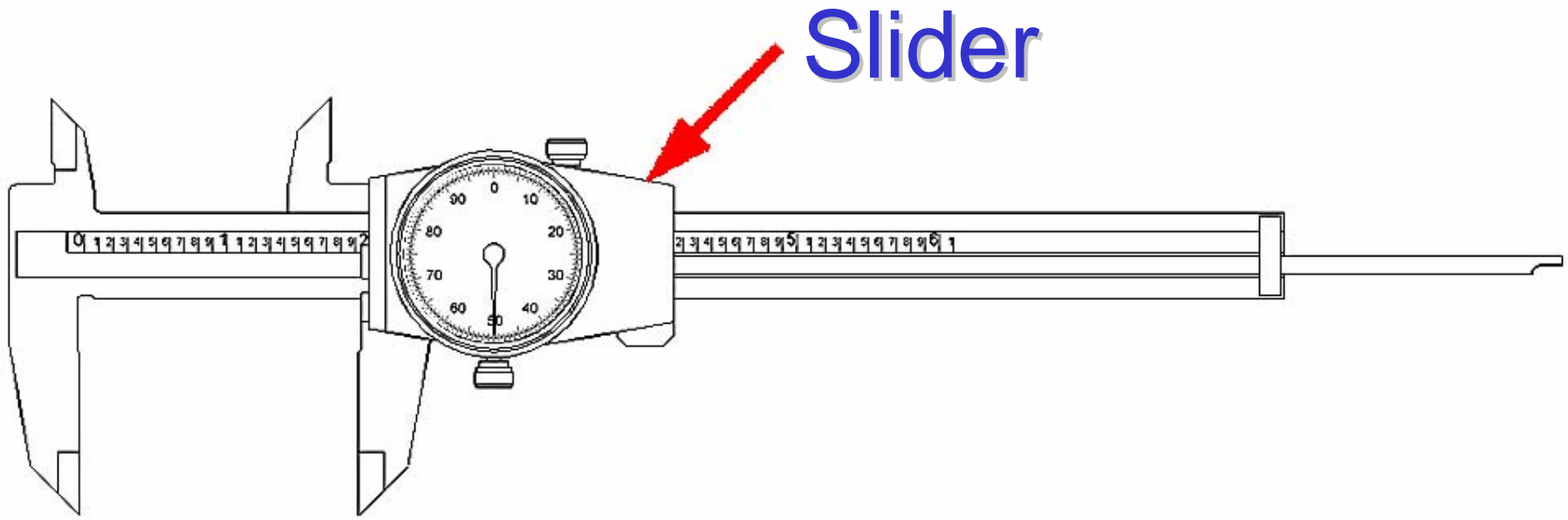


The *blade scale* shows each inch divided into 10 increments. Each increment equals one hundred thousandths (0.100").

*Note: Some dial calipers have blade scales that are located above or below the rack.*

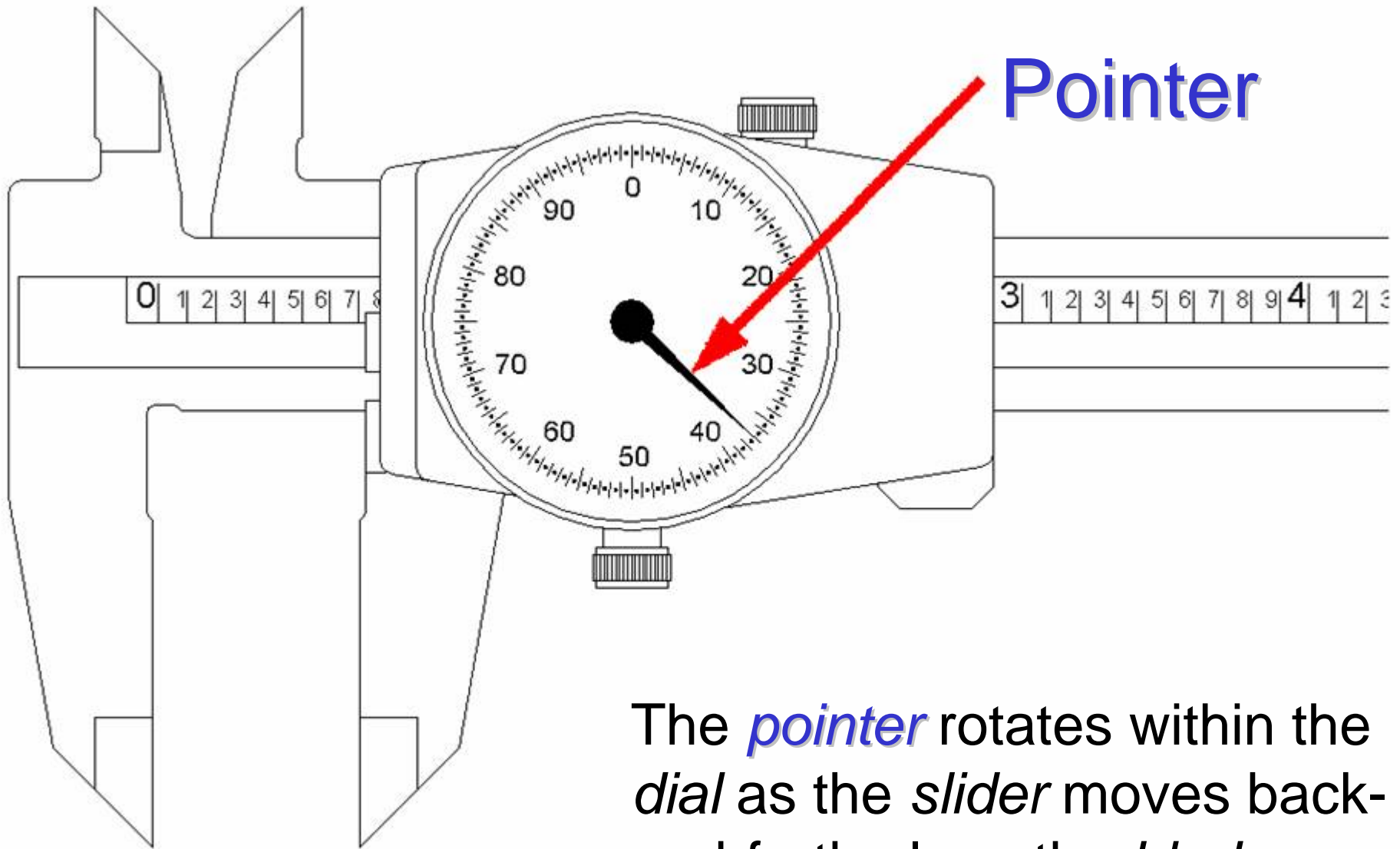


The *blade* is the immovable portion of the dial caliper.



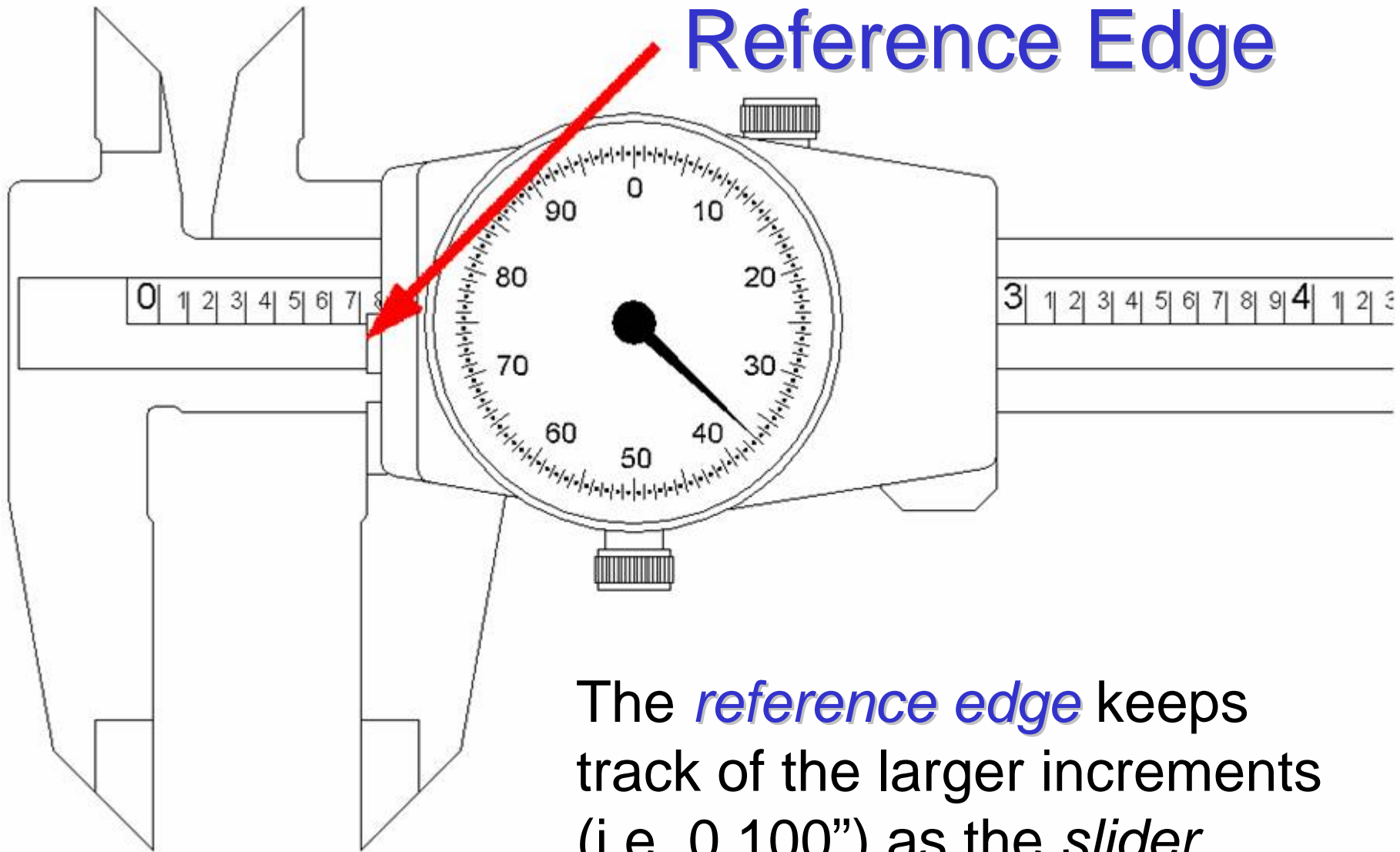
Slider

The *slider* moves along the *blade* and is used to adjust the distance between the measuring surfaces.



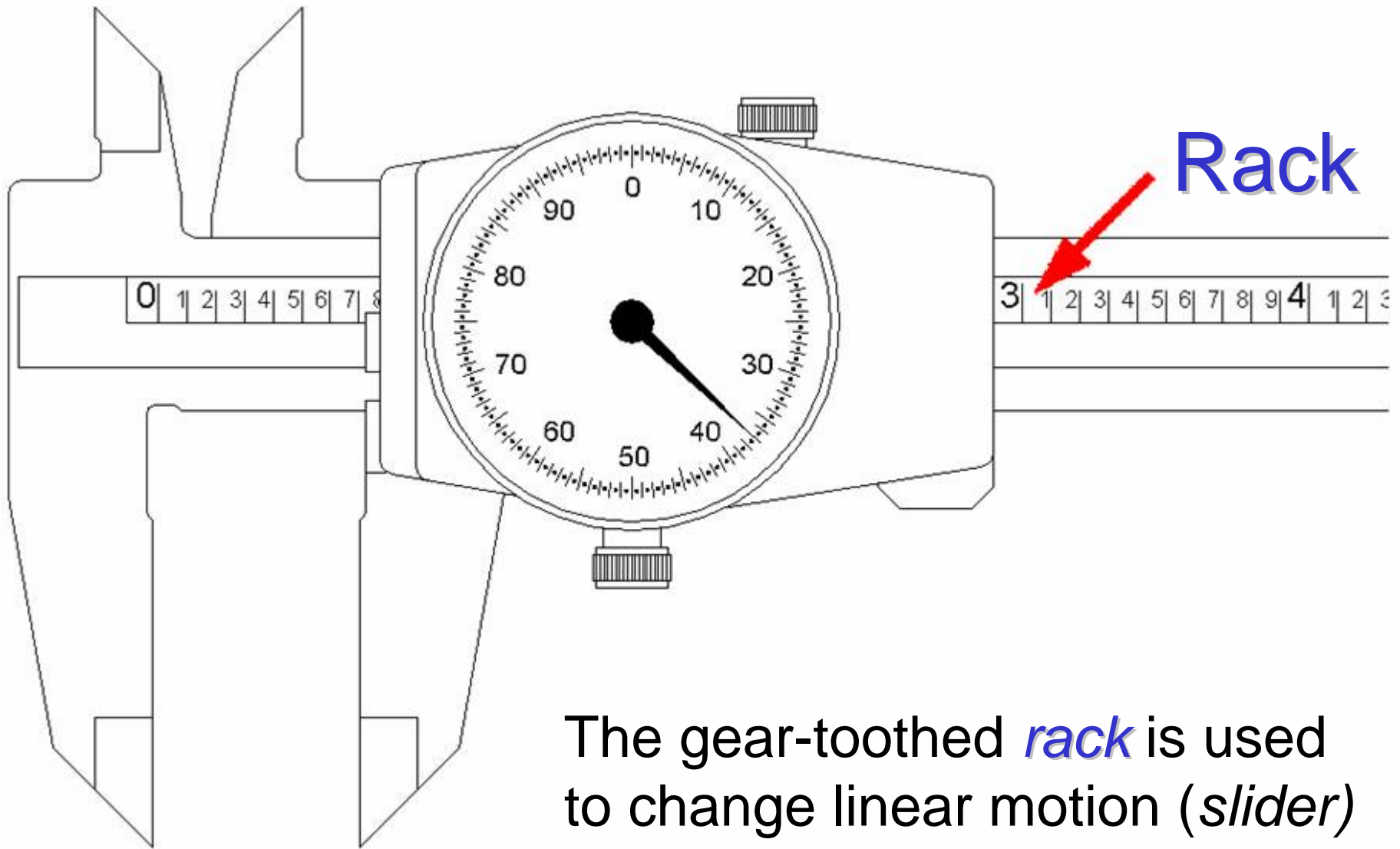
The *pointer* rotates within the *dial* as the *slider* moves back-and-forth along the *blade*.

# Reference Edge



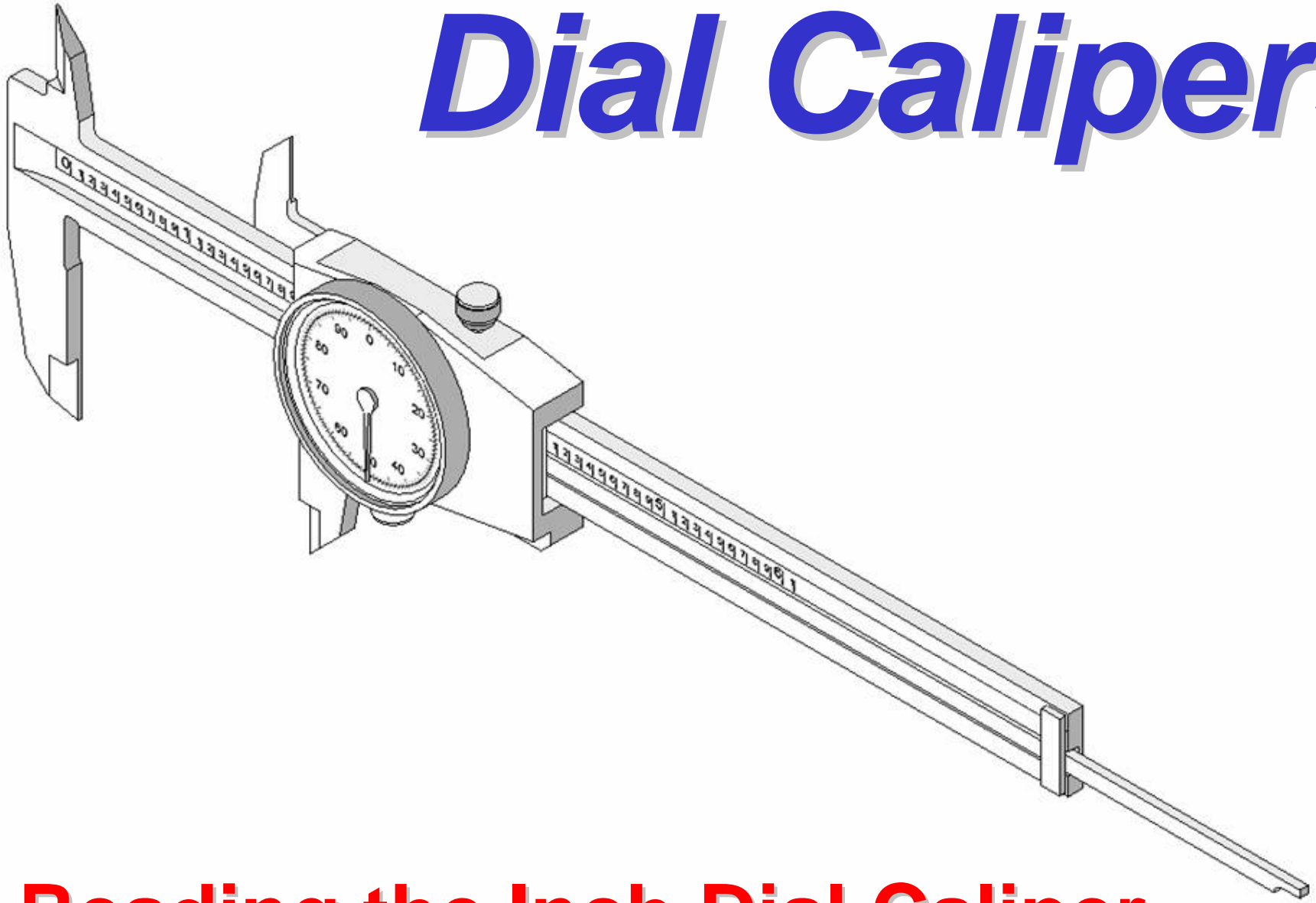
The *reference edge* keeps track of the larger increments (i.e. 0.100") as the *slider* moves along the *rack*.



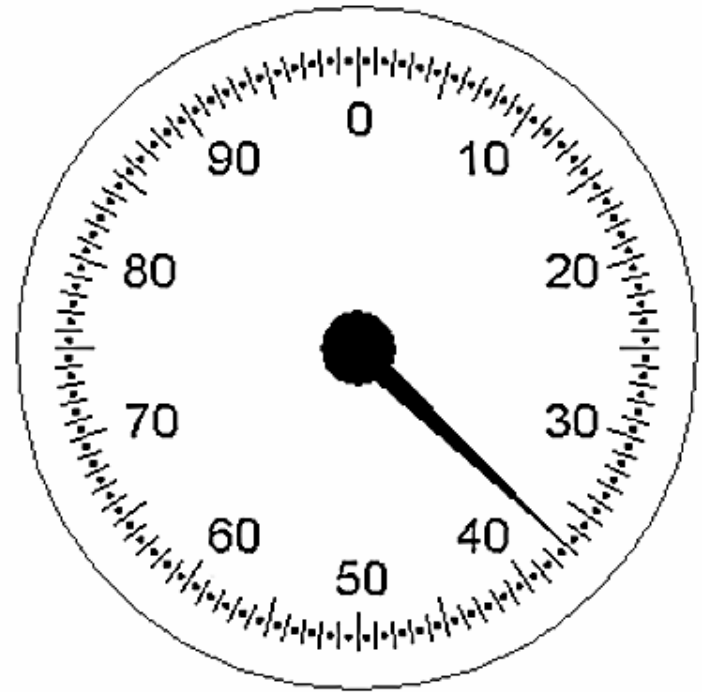
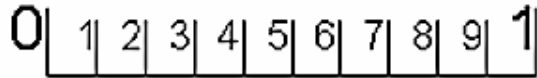


The gear-toothed *rack* is used to change linear motion (*slider*) to rotary motion (*pointer*).

# *Dial Calipers*



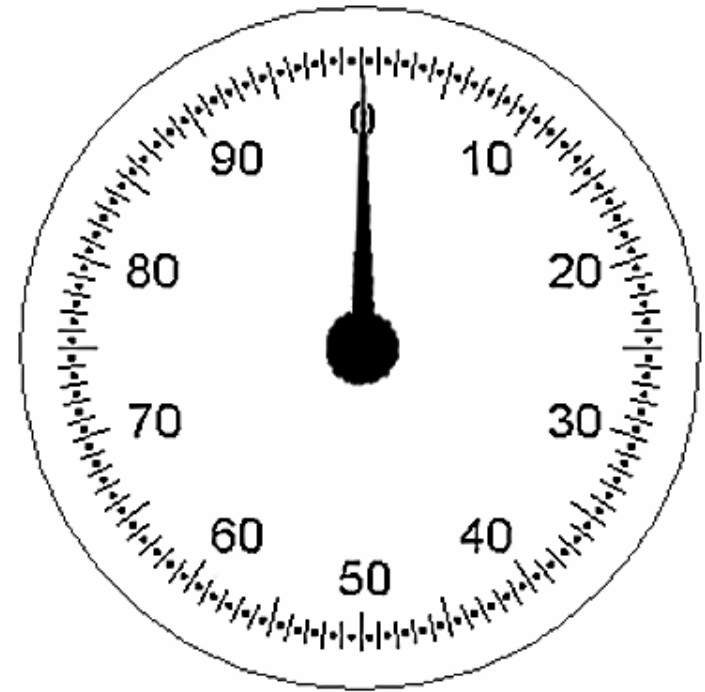
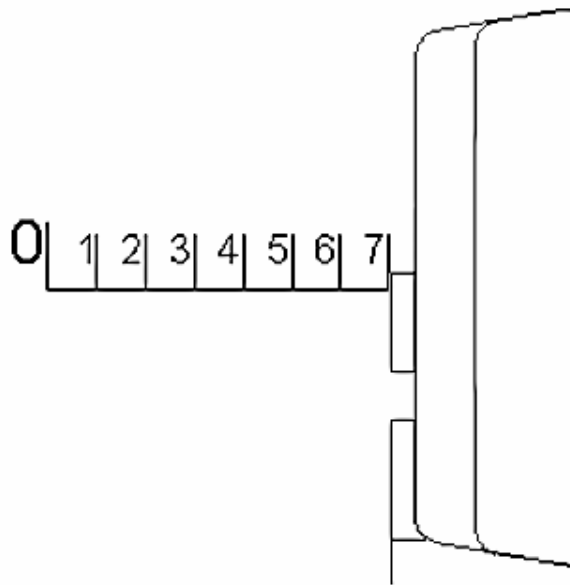
**Reading the Inch Dial Caliper**



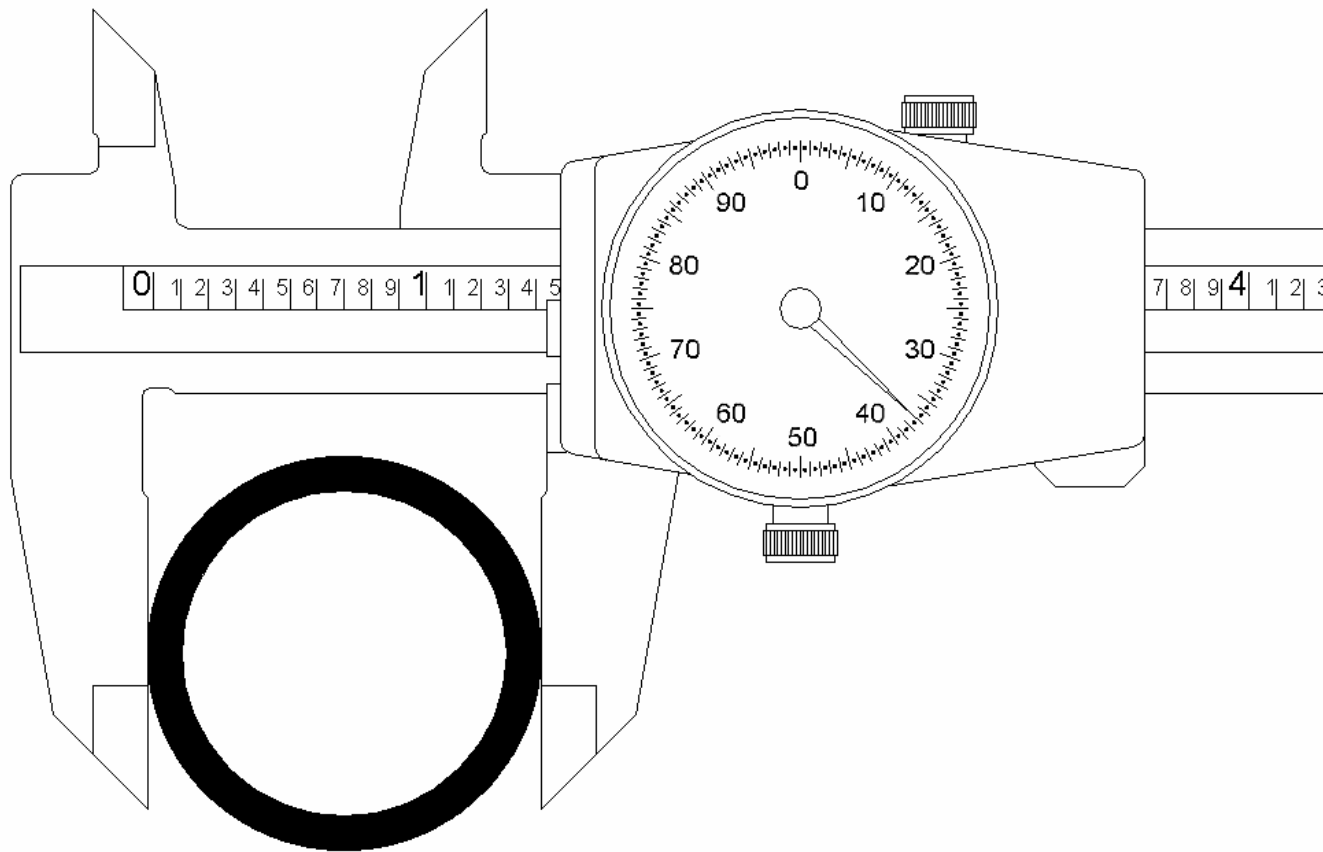
The *dial* is divided 100 times, with each graduation equaling one thousandth of an inch (0.001”).

Some *dials* also show “half-thou” (0.0005”) graduations.

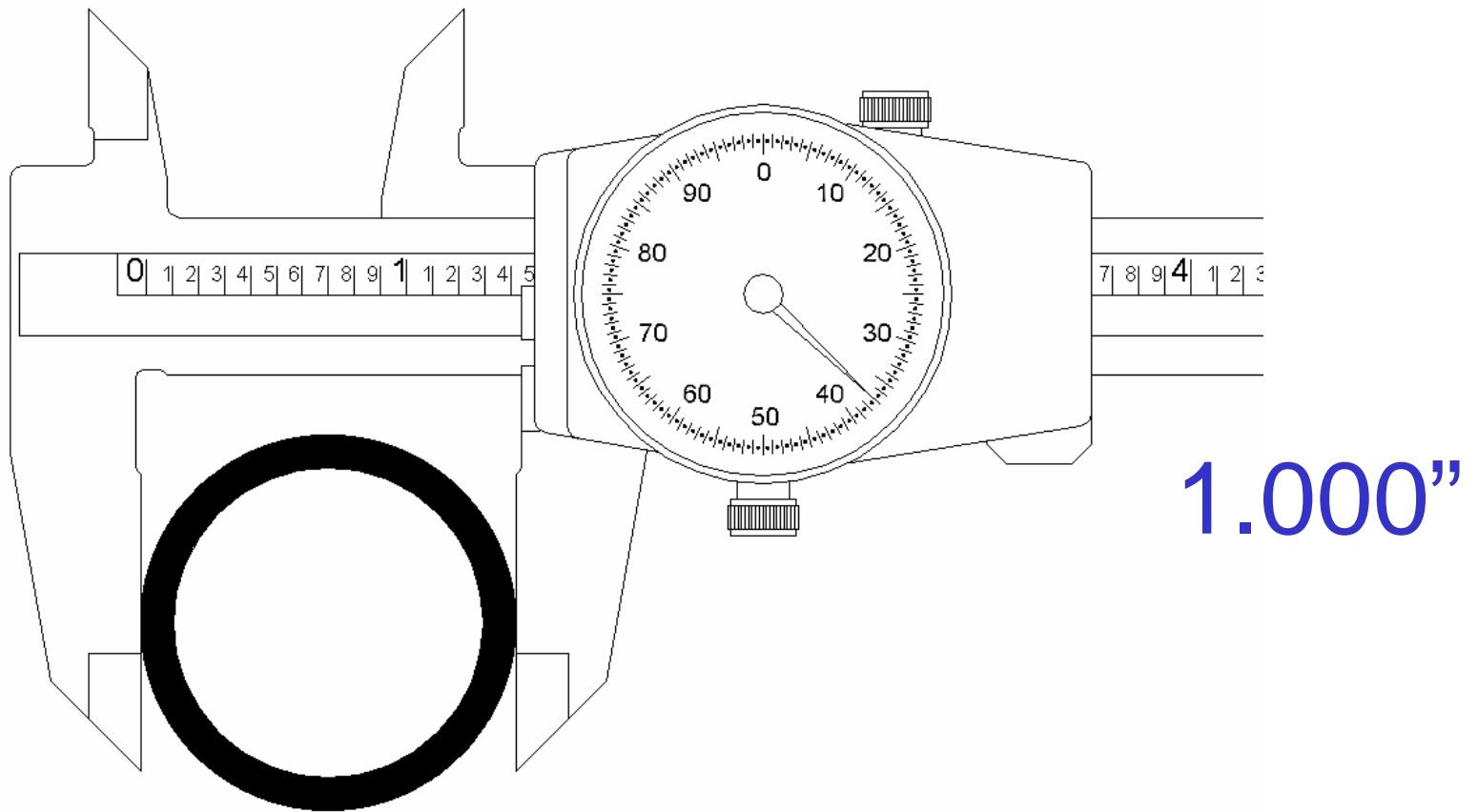
*Note: Dial face divisions and increments are not standardized.*



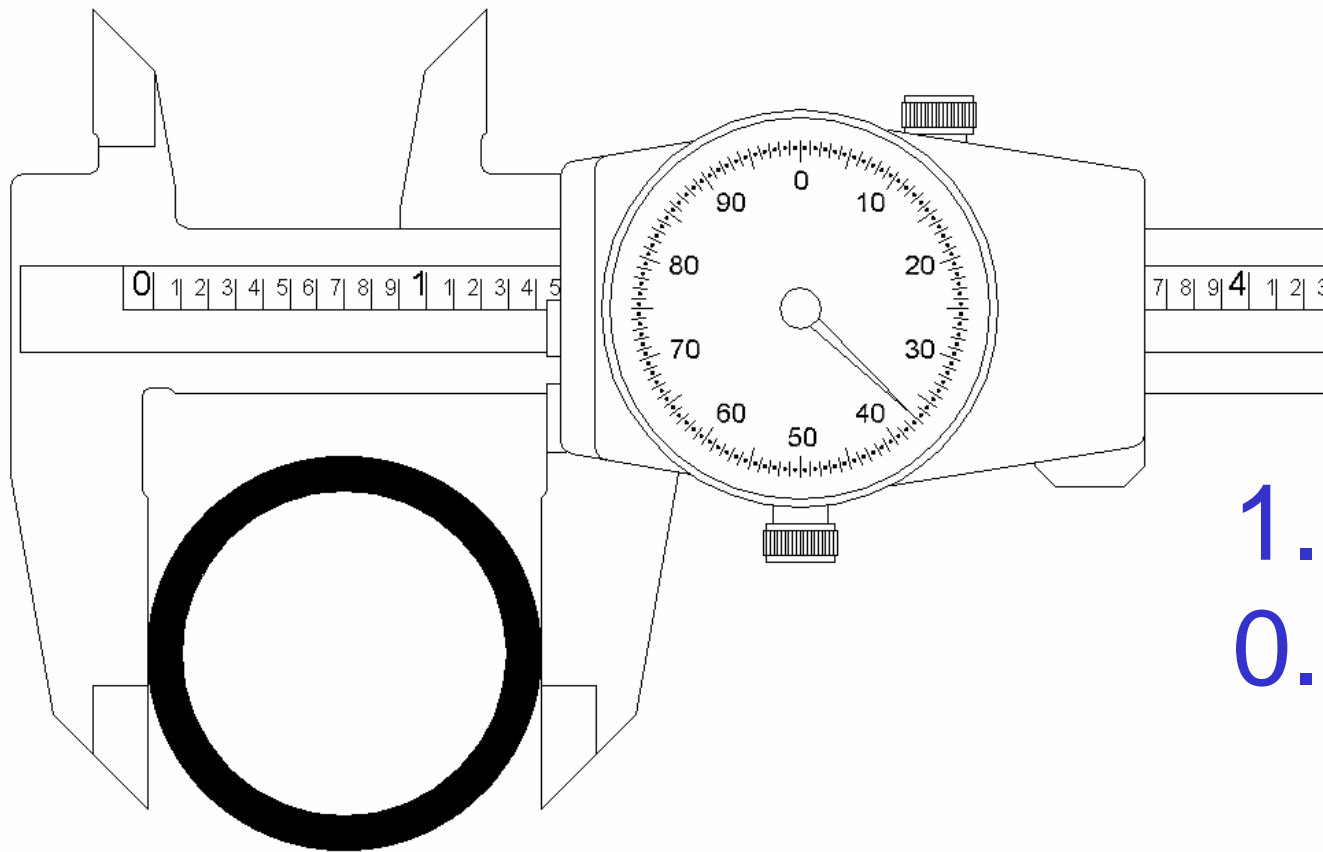
Every time the *pointer* completes one rotation, the *reference edge* on the *slider* will have moved the distance of one *blade scale* increment (0.100”).



To determine the outside diameter of this pipe section, the user must first identify how many inches are being shown on the *blade scale*.



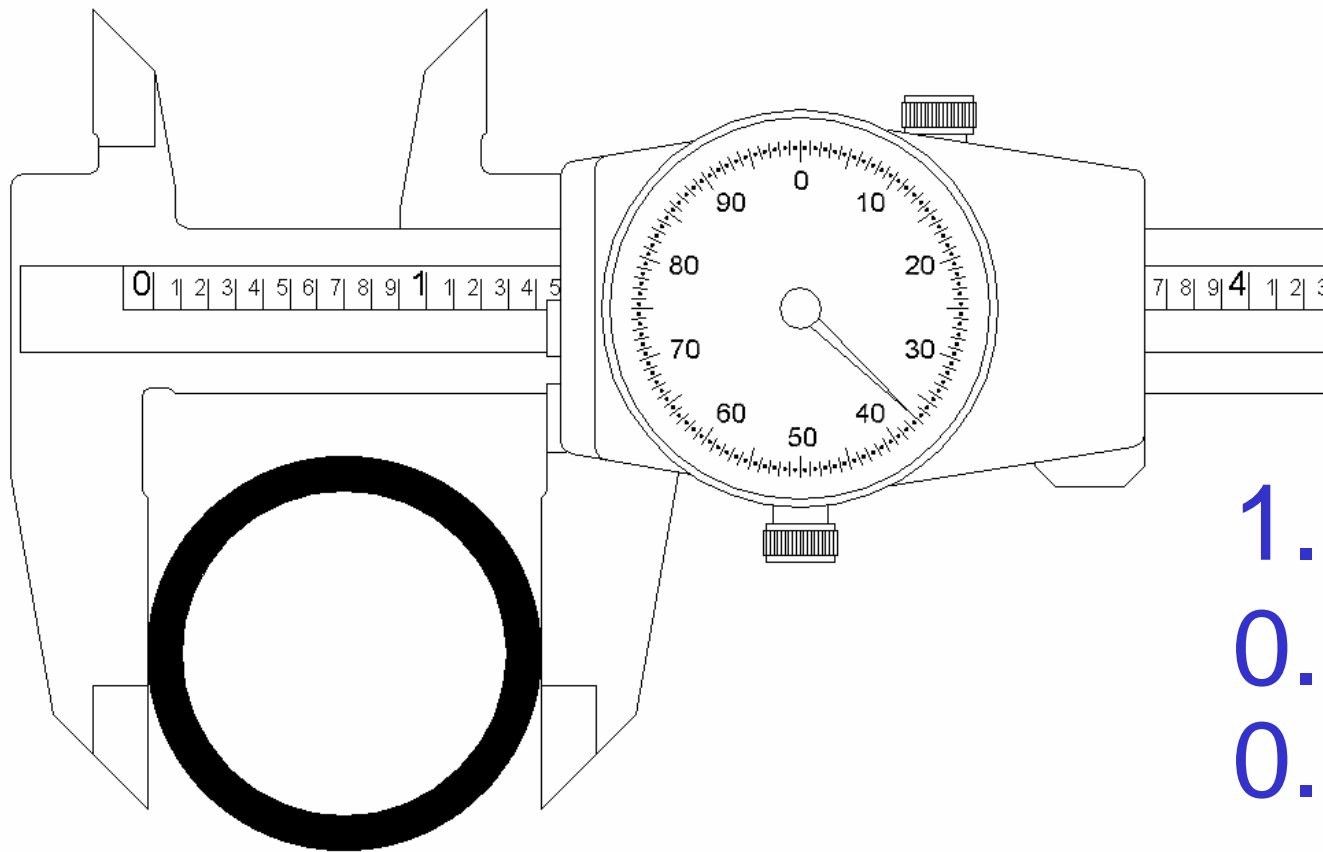
The *reference edge* is located between the 1 and 2 inch marks. So, the user makes a mental note...1 inch.



1.000"  
0.400"

The user then identifies how many 0.1" increment marks are showing to the right of the last inch mark.

In this case, there are 4...or 0.400".

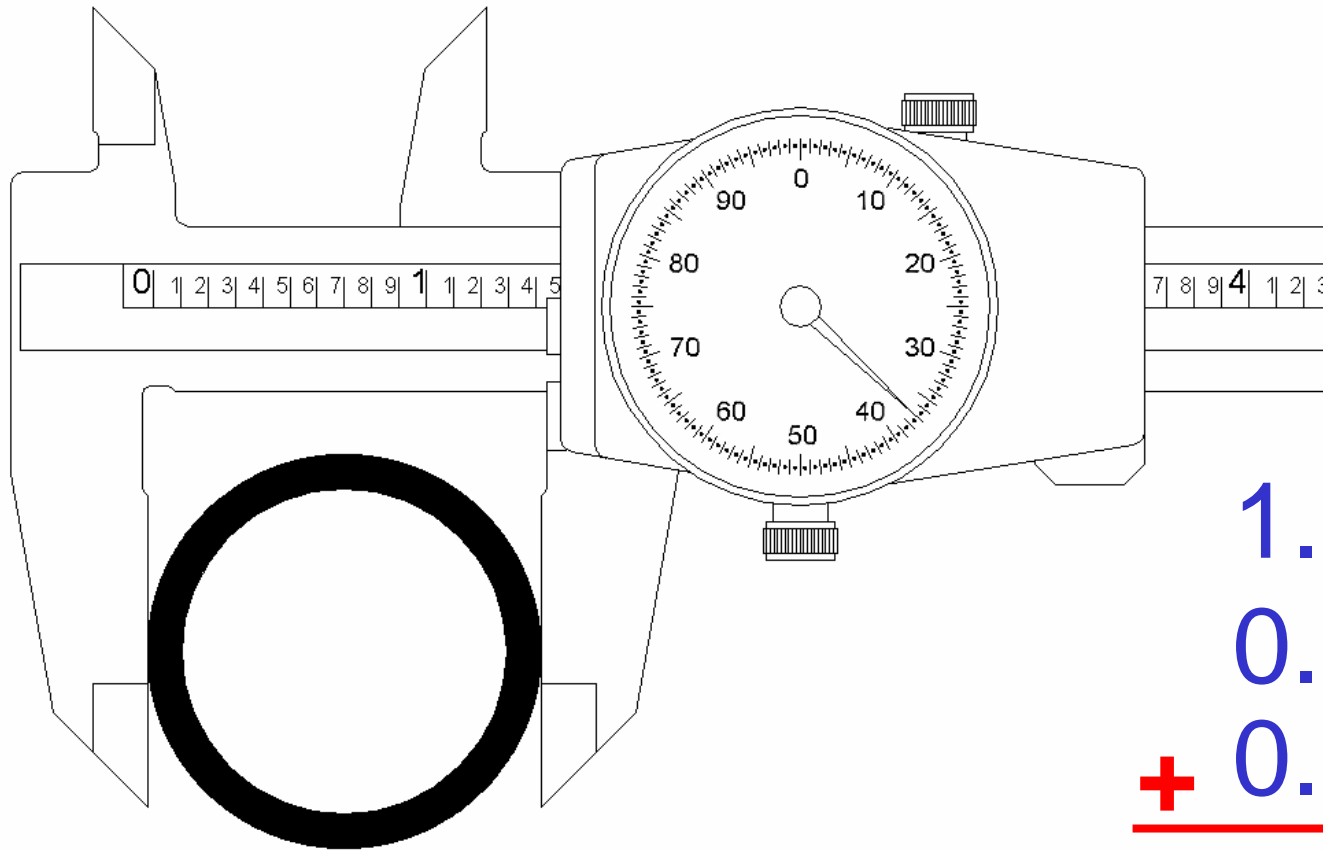


1.000"  
0.400"  
0.037"

Next, the user looks at the *pointer* on the *dial* to see how many thousandths it is pointing to.

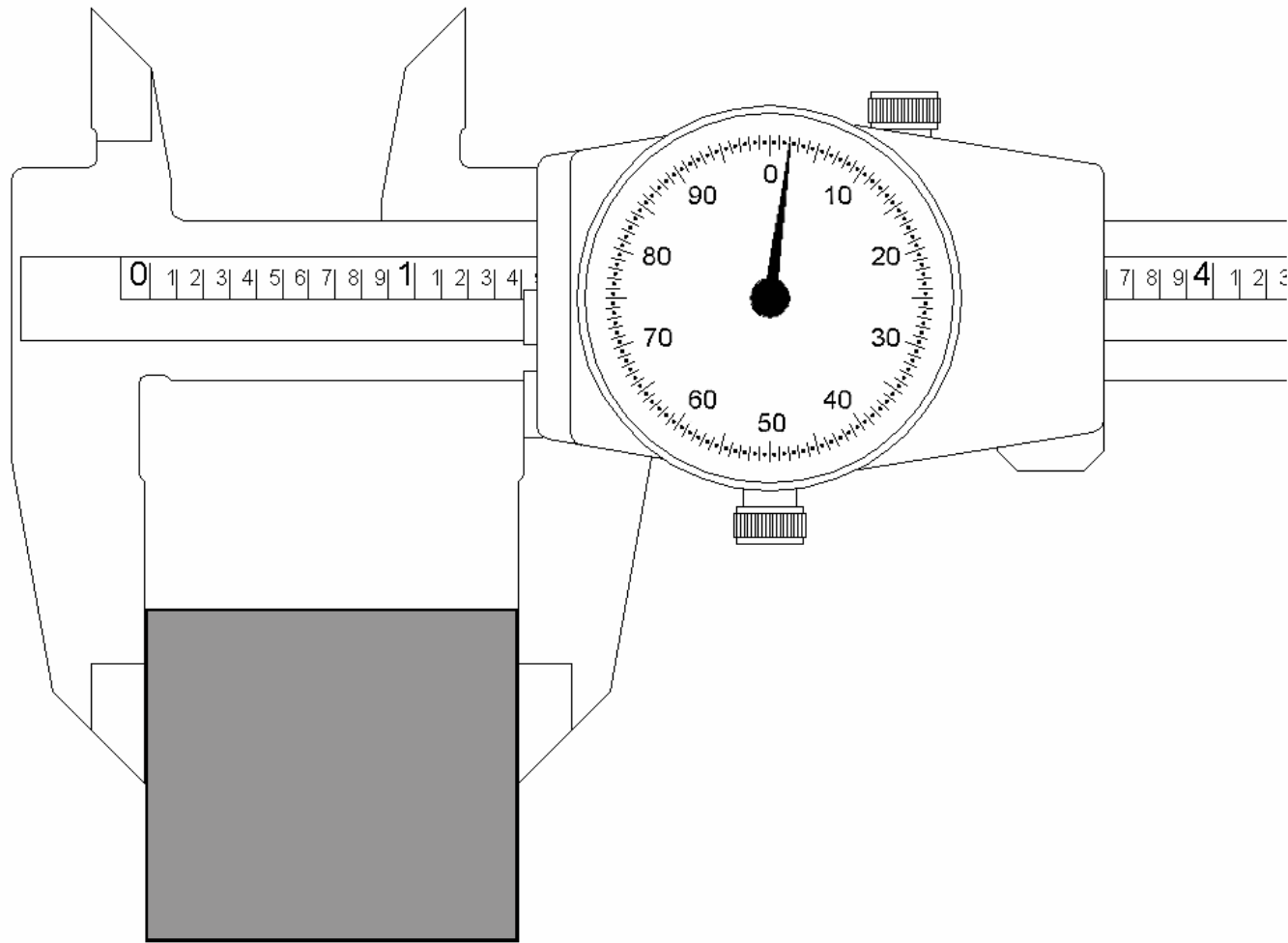
In this case, it is pointing to 37...or 0.037".



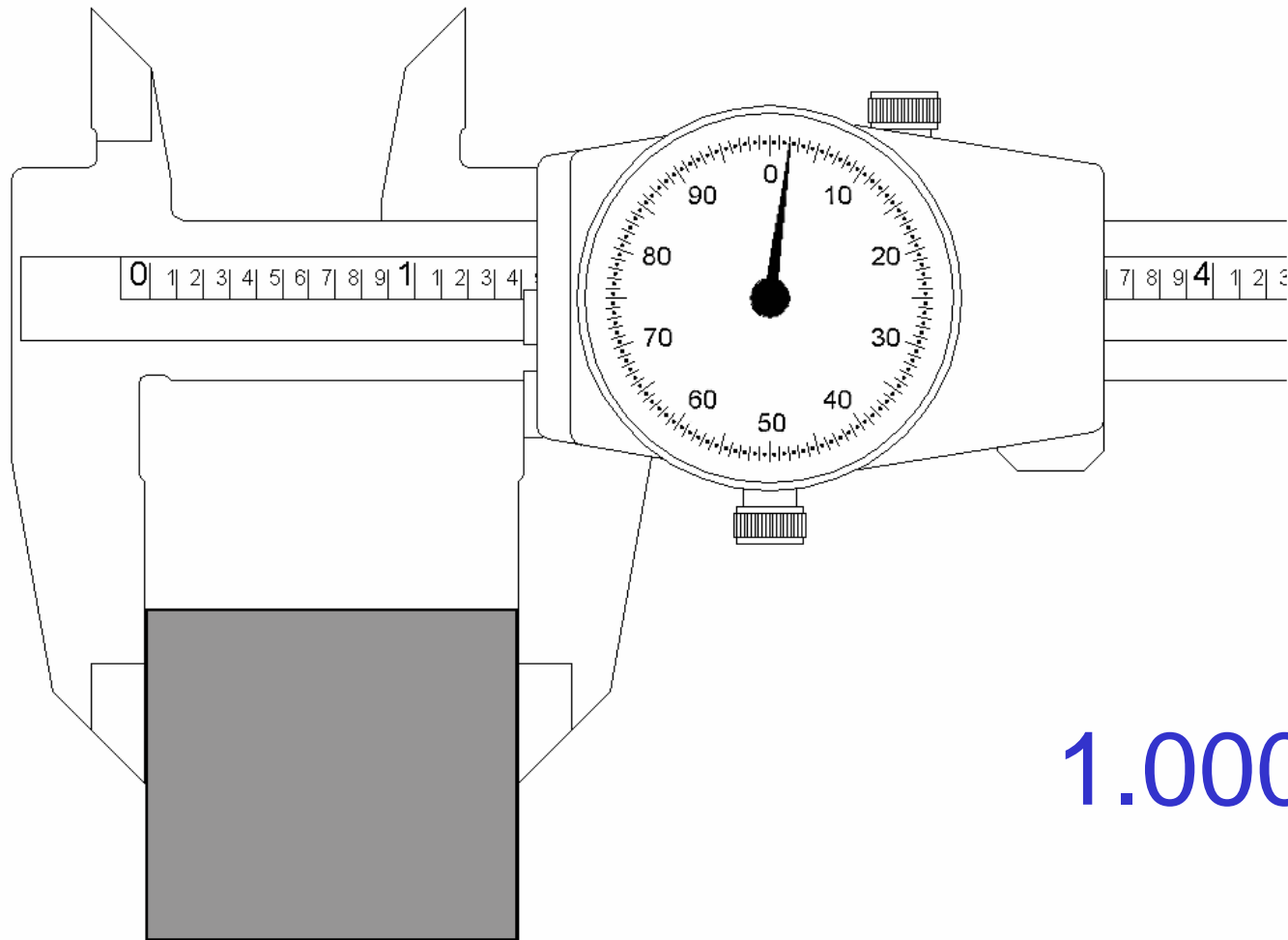


$$\begin{array}{r} 1.000'' \\ 0.400'' \\ + 0.037'' \\ \hline 1.437'' \end{array}$$

The user then adds the three values together...

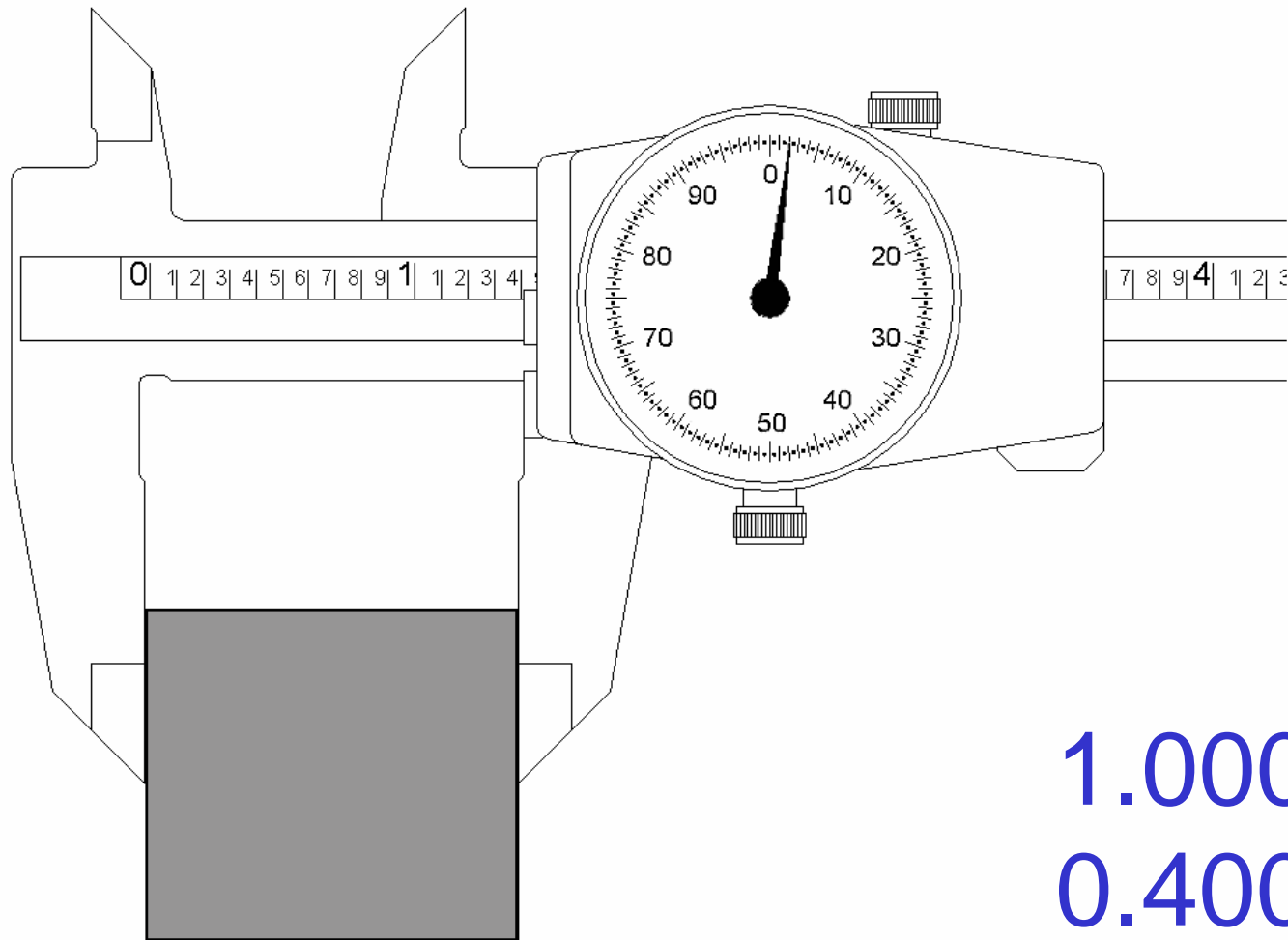


How wide is the block?



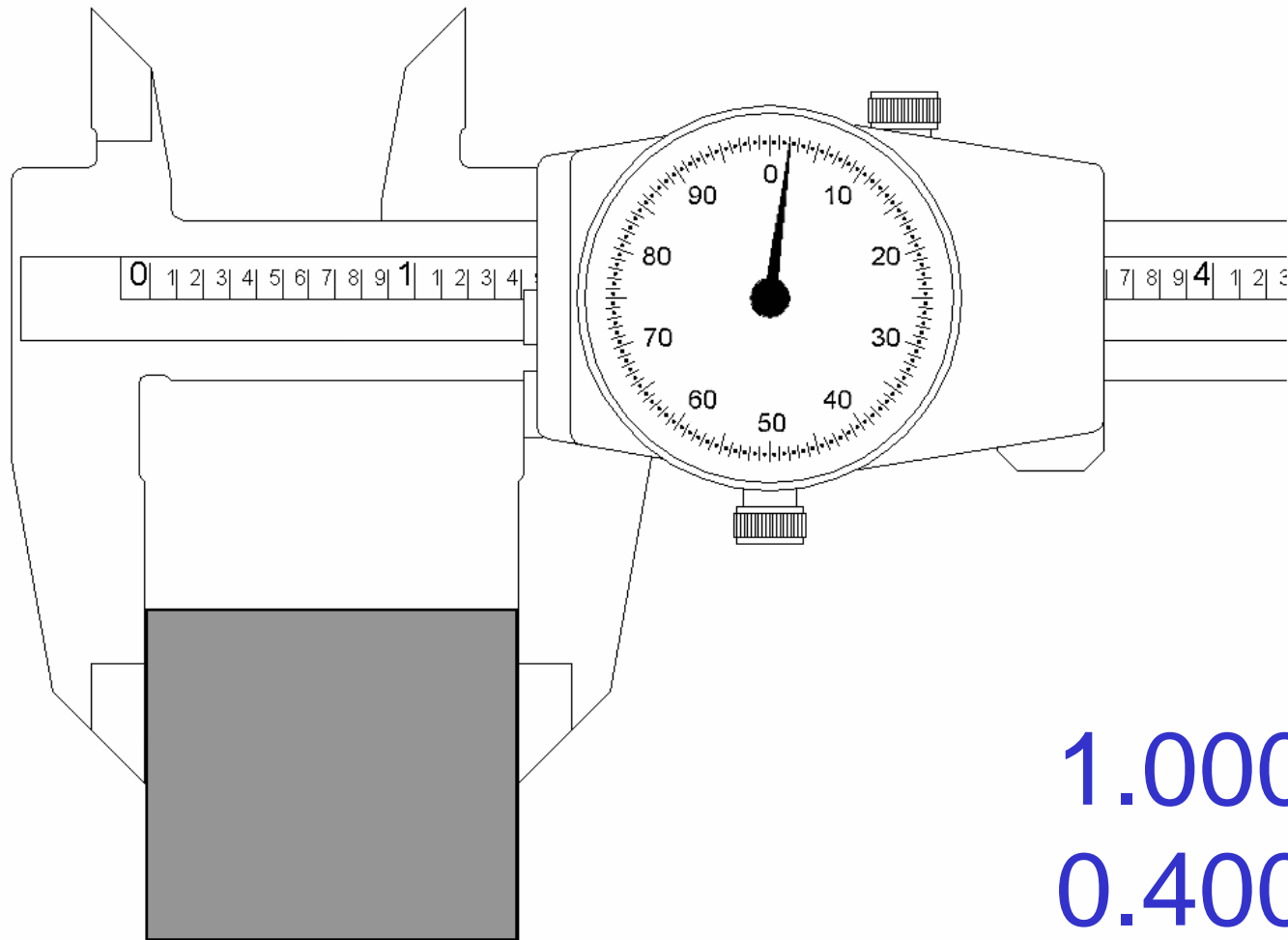
1.000"

How wide is the block?



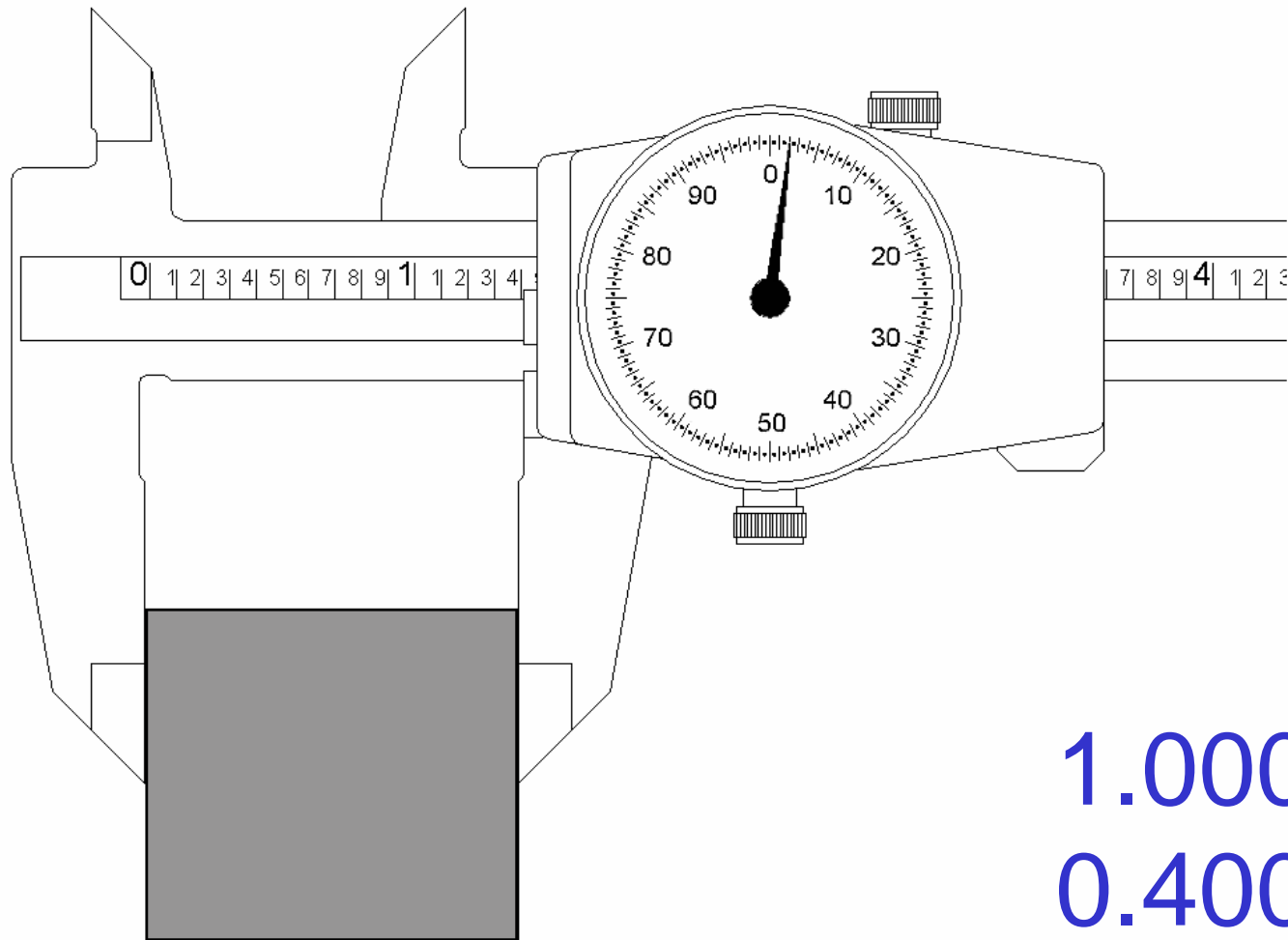
1.000"  
0.400"

How wide is the block?



How wide is the block?

1.000"  
0.400"  
0.002"



How wide is the block?

$$\begin{array}{r} 1.000'' \\ 0.400'' \\ + 0.002'' \\ \hline 1.402'' \end{array}$$