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How to read an outside micrometer

Please use the information below to help you read our .001" and .0001" outside micrometers.

Parts of a micrometer

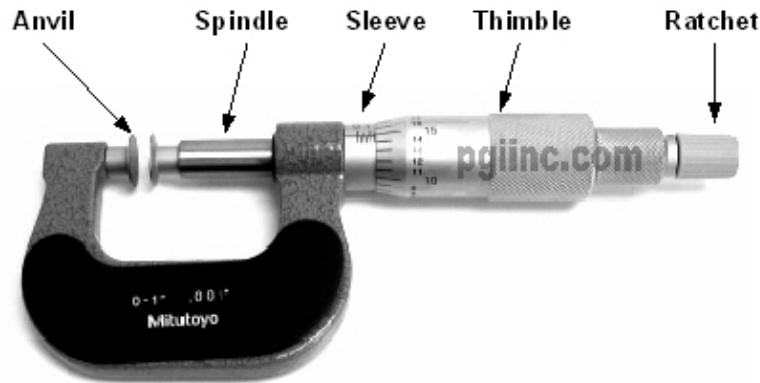
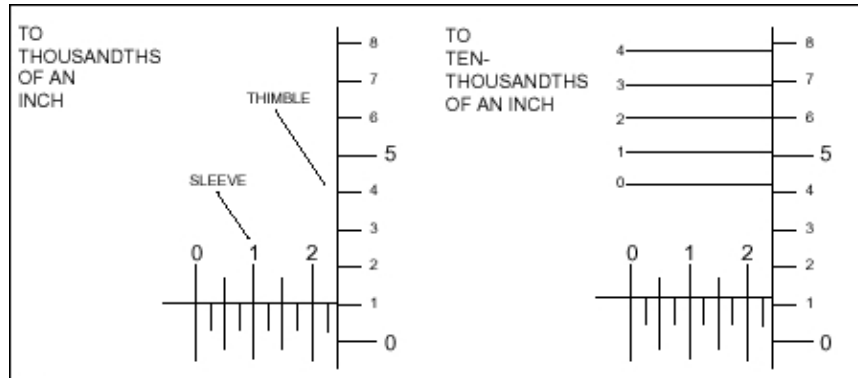


Figure 1: The parts of a micrometer

Sleeve: The Micrometer sleeve is divided into 10 equal parts, each of these parts is equal to .100" (1 tenth of an inch). Each of these 10 parts is divided into 4 equal parts. Each of these 4 subdivisions is equal to .025" or one 40th of an inch. More simply, the line on the sleeve marked "1" represents .100", the line marked "2" represents .200" and so forth.

Thimble: The thimble is divided into twenty-five equal parts, each of these parts is equal to .001" and, one complete rotation of the thimble coincides with the smallest division (.025") on the sleeve.



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Figure 2: Example measurements.

Taking a Reading on a .001 " Micrometer:

To read either a .001" or .0001" micrometer, you place the material to be measured between the anvil and spindle, and then turn the ratchet until the spindle closes down and stops moving. Then you read the markings on the sleeve and thimble. In the case of a .0001" micrometer you would then read the markings on the vernier scale to get the .0001" measurement.

In our example below, as we take our measurement, we fill in a box for each reading. We suggest you try this method while you are learning to measure with outside micrometers. Soon enough, you will become very fast reading these micrometers.

1. **Read the sleeve:**

- a. In [Figure 2 above](#), when tightening down the thimble on our material, it stopped at a point to the right of "2" on the sleeve, this indicates .200". We wrote this in row (1) in the table below.
- b. There is one line visible between the graduation numbered "2" on the sleeve and the edge of the thimble, this indicates .025". We wrote this in row (2) in the table below.

2. **Read the thimble:** The graduation numbered "1" on the thimble coincides with the center line of the sleeve. This indicates .001". We wrote this in (3) in the table below.
3. **Add it all up:** Now just add all the numbers together to determine the thickness of your material.

| | |
|---|--------------|
| (1) Reading on the Sleeve | .200" |
| (2) No. of lines between "2" and the edge of the thimble | .025" |
| (3) Thimble line corresponding to the center line of the sleeve | .001" |
| TOTAL READING | .226" |

Taking a Reading on a .0001 " Micrometer:

To read to one ten-thousandth requires an additional scale called the "Vernier" scale. The vernier consists of ten divisions, marked on the sleeve, Each graduation of the vernier scale on the sleeve, represents .0001".

1. **Read the sleeve:** Follow the same instructions as step 1 above.
2. **Read the Thimble:** Follow the same instructions as step 2 above.
3. **Read the vernier:** Each graduation of the vernier scale on the sleeve measures .0001" (or one ten-thousandth of an inch). To

read the vernier, find the graduation on the vernier scale which lines up with with a graduation on the thimble and read the number off the vernier scale. In [figure 2 above](#), the vernier graduation numbered "2" lines up exactly with a thimble line (number "6"), therefore you read the vernier line "2" which indicates .0002".

4. **Add it all up:** Now just add all the numbers together to determine the thickness of your material.

| | |
|---|---------------|
| (1) Reading on the Sleeve | .200" |
| (2) No. of lines between "2" and the edge of the thimble | .025" |
| (3) Thimble has passed .001" line on the Sleeve | .001" |
| (4) Vernier line that coincides exactly with a Thimble Line | .0002" |
| TOTAL READING | .2262" |