

OCULAR MICROMETER

I. USE OF THE OCULAR MICROMETER:

A. Procedure:

1. Place the ocular lens containing a micrometer disc on the microscope.
2. Focus on the object to be measured and determine the size in ocular units.
3. Multiply the ocular units by the calibration factor for that specific microscope, objective and ocular micrometer. The units of the micrometer disc are arbitrary and a calibration procedure must be done to determine the calibration factor for each different objective and each different microscope.

B. Example:

A hypha was measured using an ocular micrometer in the eye piece of a phase contrast scope and its 40X darkfield objective. The hypha was 3 ocular micrometer units wide. The calibration factor for that specific micrometer used on the phase scope with the 40X darkfield objective is 2.5 μm .

$$\underline{3} \text{ ocular micrometer units} \times \frac{\underline{2.5} \text{ } \mu\text{m}}{\text{ocular micrometer}} = \underline{7.5} \text{ } \mu\text{m ocular micrometer}$$

The hypha is 7.5 μm wide.

II. CALIBRATION OF THE OCULAR MICROMETER:

Ocular micrometers are calibrated by comparing the ocular micrometer scale with a calibrated stage micrometer. The stage micrometer is a microscope slide that has a carefully calibrated scale which is divided into 0.1 mm and 0.01 mm units.

A. Procedure:

1. Install the 10X ocular containing the ocular micrometer disc in the microscope.
2. Place the calibrated stage micrometer slide on the stage and focus on the scale.
3. Adjust the field so that the zero line of the ocular disc scale is exactly superimposed upon the zero line of the stage micrometer scale.
4. Without moving the stage micrometer, locate the point as far to the extreme right as possible where any two lines are exactly superimposed upon each other.
5. Count the number of divisions (mm) on the stage micrometer between the zero line and the superimposed line to the far right.
6. Count the number of ocular divisions between the zero line and the superimposed line to the far right.
7. Divide the distance determined in step 5 by the number of ocular divisions in step 6 and multiply by 1000 to give the ocular micrometer units in μm .

$$\frac{\text{stage micrometer divisions (mm)}}{\text{ocular micrometer divisions}} \times \frac{1000 \text{ } \mu\text{m}}{\text{mm}} = \underline{\text{ } \mu\text{m}} \text{ per ocular unit}$$

8. Repeat steps 3 through 7 for each objective on the microscope. If the ocular micrometer is moved to a different scope, the calibration procedure must be repeated. If a new objective is added to the microscope, the calibration procedure must be done for the objective.

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II. CALIBRATION OF THE OCULAR MICROMETER:

B. Example:

Using an ocular micrometer in the eye piece of a phase contrast scope and its 20X objective, it is found that 45 ocular units are equal to 0.22 mm on the stage micrometer scale.

$$\text{One ocular unit} = \frac{0.22 \text{ mm}}{45 \text{ units}} \times \frac{1000 \text{ } \mu\text{m}}{\text{mm}} = 4.9 \text{ } \mu\text{m}$$

III. REFERENCES:

Todd, JC: Clinical Diagnosis by Laboratory Methods, Philadelphia, PA, W.B. Saunders Company, 1979.