

Microscope Stage Micrometer

The stage micrometer is used to measure the field size for 40X and 100X objective lenses and for calibrating an eyepiece reticle. These calibrations allow the microscopist to measure the size of objects being examined: somatic cells, bacteria, feedstuffs, etc. and to obtain cells counts.

The stage micrometer offered by Weber Scientific is a rectangular glass slide measuring 1 inch wide and 3 inches long. It has a 2 mm scale divided in 200 increments of 0.01 mm.

Procedure for micrometer: properly orient the micrometer on the microscope stage being sure that the correct side of the slide is uppermost. The micrometer scale is located in a small circle close to the middle of the glass slide. Focus on this small circle with the 40X lens until the micrometer scale is clearly focused. Adjust the stage until the micrometer scale is exactly centered both left to right and up and down. Adjust the stage until the left end of the micrometer scale is aligned with the left edge of the field of vision. Count and record the number of scale divisions visible in the entire field of vision. Apply a small amount of immersion oil to the slide just under the 40X objective. Rotate the turret to the 100X objective and focus on the micrometer stage. As with the 40X lens, ensure that the micrometer stage is exactly centered in the field of vision for the 100X objective. Count and record the number of scale divisions visible in the entire field of vision.

The field of vision or field of view information may be included with objective lens specifications supplied with your microscope.

Example: 40X lens - field of vision is 43 divisions or 0.43 mm
100X lens - field of vision is 17 divisions or 0.17 mm

The ocular micrometer/ eyepiece reticle: For the purpose of measuring the size of cells, one of the eyepiece lens' of the microscope can be fitted with a reticle or micrometer that provides a scale or grid pattern divided into small increments or divisions. The value of each of these increments or divisions is related to the power of the objective lens used. If the reticle division is 0.1 mm, this means that for a 100X objective lens, the value of each division is 0.001 mm per division. For a 40X objective, the value of each division becomes 0.025 mm. (Formula: reticle/ocular micrometer division divided by objective power = value per division).

Procedure for calibrating ocular micrometer/ eyepiece reticle

Move the stage micrometer until one line coincides with the farthest left line of the eyepiece reticle. Count across to the right to any other point where a line on the eyepiece scale coincides with a line on the stage micrometer. Should no lines coincide, estimate the fraction of the space between the last two lines at the extreme right. The magnification factor is calculated by dividing the value on the eyepiece reticle by the value on the stage micrometer. For example: if an object measures 3.4 mm on the eyepiece reticle, and 0.34 mm on the stage micrometer, the **magnification factor** is: $3.4 / 0.34 = 10$

Therefore, the actual size of the object being examined is calculated by dividing the size of the object in the eyepiece reticle by the **magnification factor**. For example, if an object measures 1.6 mm on the eyepiece reticle the actual size is: $1.6 / 10 = 0.16$ mm