Swing-Out Condenser

It is not practical to use a single condenser with an entire range of objectives (4x-100x) due to the broad range of light cones that must be produced to match the numerical aperture of each objective. When using a lower power objective, such as 4x, the illumination cone will have a diameter of about 8mm, while the high power objectives (60x to 100x) need a highly focused cone measuring about 0.2-0.4mm in diameter. The numerical aperture determines the size of the cone of light. When the numerical aperture is bigger, the cone of light will be smaller.

In order to fill the field of view with light, it may be necessary to remove the top lens of the condenser. Many manufacturers now produce a condenser which flips over completely called a swing-out condenser. These condensers work for objectives ranging from 4x-100x with numerical apertures ranging from 0.65 / 1.25 N.A. (for 40x – 100x) or 0.9 / 1.25N.A. (for 60x – 100x)

When the objective is changed, for example from a 10x to 20x, the aperture diaphragm of the condenser must also be adjusted to provide a cone of light that matches the numerical aperture of the new objective. This is done by turning the aperture diaphragm control. There is usually a small index above the control with the exact indication of the adjustment that needs to be made for each objective.

Condensers that have a numerical aperture value of 0.95 or less are intended for use with “dry” objectives. Flip top condensers that have a numerical aperture greater than 0.95 are intended for use with oil-immersion objectives and they must have a drop of oil placed between the bottom of the microscope slide and the condenser top lens when examining critical samples.