8.2 Comparison Microscope

This side-by-side, point-by-point examination is an excellent microscopic technique to visually compare fibers, paint and other trace evidence.

Minimum Standards and Controls

- If measurements are made with an ocular scale, please refer to **Trace Verification Standards 12.2 Microscopic Ocular Unit Calculation**

- Validation of a Comparison Microscope:

The magnification of corresponding objectives on each stand (e.g. 10x vs.10x) should be compared prior to initial use of the microscope, using a stage micrometer scale and an eyepiece reticle. The magnification of corresponding objectives when expressed as micrometers per optical scale division should differ by no more than 2%. Once uniform magnification for the two stands has been verified, it should not need to be repeated unless one or more optical components are replaced.

The suitability of balance for light intensity, color temperature and overall optical quality should be verified for each use of the microscope and each adjustment of illumination conditions by using one or more pairs of test slides. These may include samples of multiple fibers taken from the same source, or two sections of the same fiber cut in half, with the two halves mounted on separate slides. The fibers should be delustered and of uniform color (not colorless) and overall appearance.

To verify uniform illumination, adjust the illumination conditions to those that will be used for sample examination, including proper Köhler illumination for both stands. Adjust the substage irises on both condensers to the same aperture setting and the lamp controls (if there are two) to the same voltage setting. For this purpose, stands with the capability for pre-set illumination conditions are desirable. Place one test slide on each stage and verify with side-by-side examination using each objective that the fiber samples are microscopically indistinguishable. Exchange the test slides on the two stages and repeat these steps