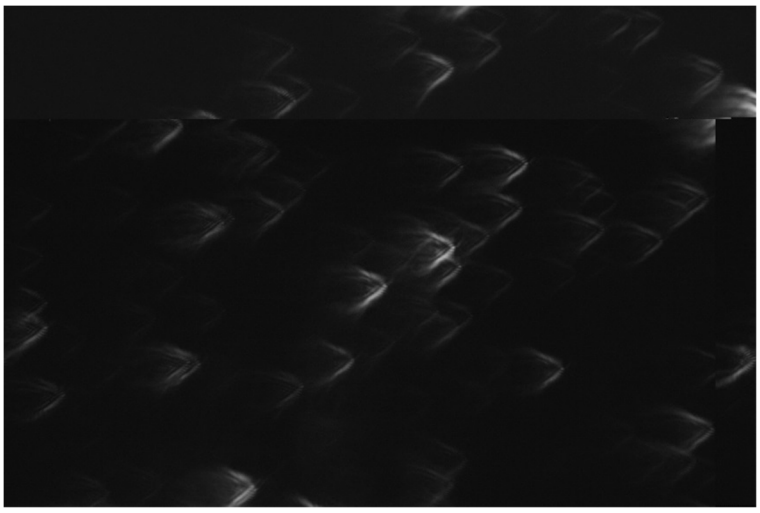
Introduction

The Beck reflecting objectives require the relative centration of the two mirrors to be accurately aligned for optimum resolving power – i.e. their two axes need to be exactly coaxial. Although this alignment is initially done at the factory it cannot necessarily be maintained during shipment. It also needs resetting whenever the tube length/cover slip setting is changed.

The alignment procedure using the 'silverpoint' slide is described in the product specific Beck User Guides (see www.reflectingobjectives.com). However, this document goes into more detail and shows typical images that occur during the adjustment process.

Alignment

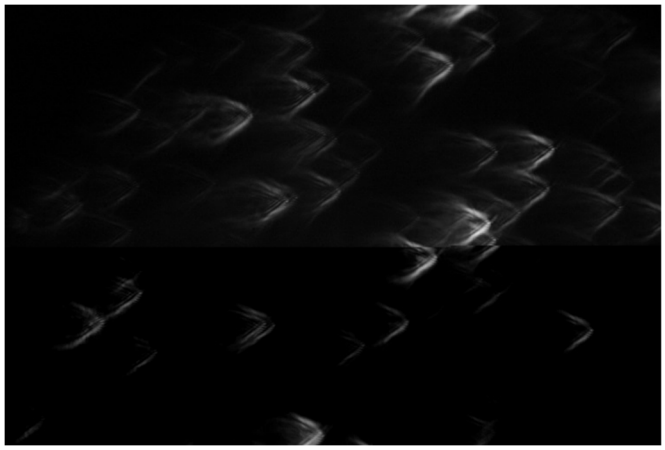
First mount the objective and ensure that it is correctly illuminated in transmission.
The following is a sequence of photographs taken through the eyepiece of a microscope showing the appearance of the silverpoint slide during adjustment. [NB The field of view will usually be circular!]
Initially, the slide will look something like this:



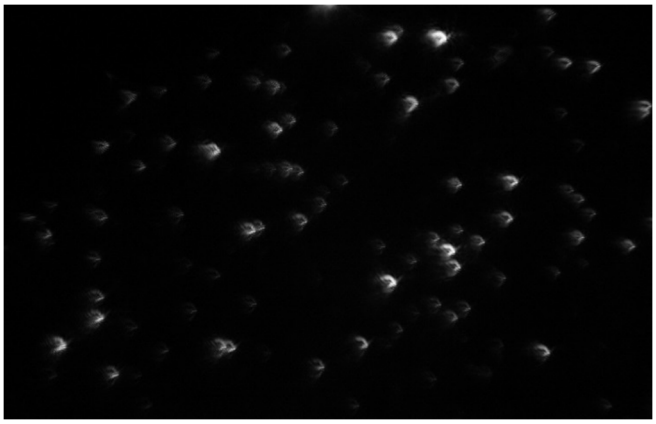
The point images are comet-like because misalignment causes coma to be introduced. The differing brightness occurs because the pinhole sizes range from approximately 0.5 to 5 microns diameter.

The arrow/comet shapes point in the general direction in which the secondary mirrors needs to be adjusted. If this direction lines up with one adjustment direction then alignment is relatively easy. If, as is generally the case, the direction of the coma lays between the two adjustment axes, both will need adjustment.

The mirror is adjusted so that the coma is reduced.....

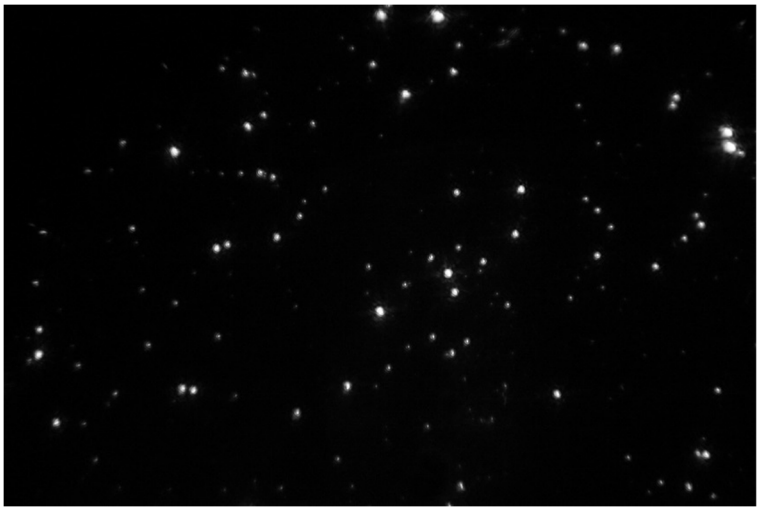


.....and reduced.....



.....and reduced.....(nearly there.....)

Until, finally, the image looks like this:



Each image point in the central region of the image field should be perfectly circular and comprise a circular disc with one or two faint rings around the outside. This is the diffraction limited Airy disc. You will be confident that you have correctly aligned the objective when this condition is reached and when the rings remain continuous and circular each side of best focus.
Close to the edge of the field the points may go slightly out of focus and may show a small amount of residual coma – this is to be expected.
The objective is now ready to use.

Notes:

1) As well as checking the objective when it is first installed, it is recommended that the user checks the performance of the microscope at the start of each session, every time the tube length setting is changed or whenever the microscope or instrument is moved to a new position.
2) Always perform this adjustment ***after*** the tube length / cover slip setting is changed – never before!

For further information on Beck's range of reflecting objectives please go to:

www.reflectingobjectives.com