

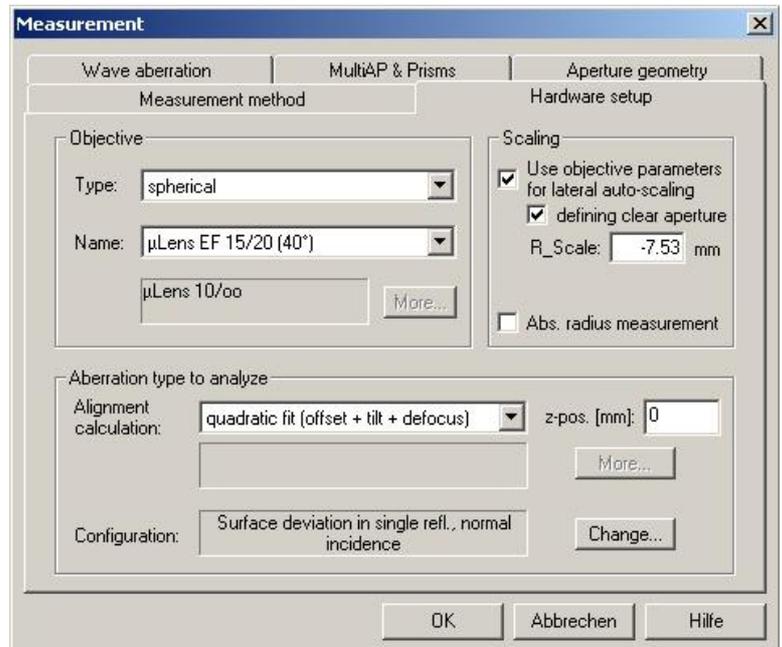
## Feature: Radius Measurement

### General

The described feature is available for μShape 4.2 and higher. The user interface of the feature may differ slightly in the different software releases.

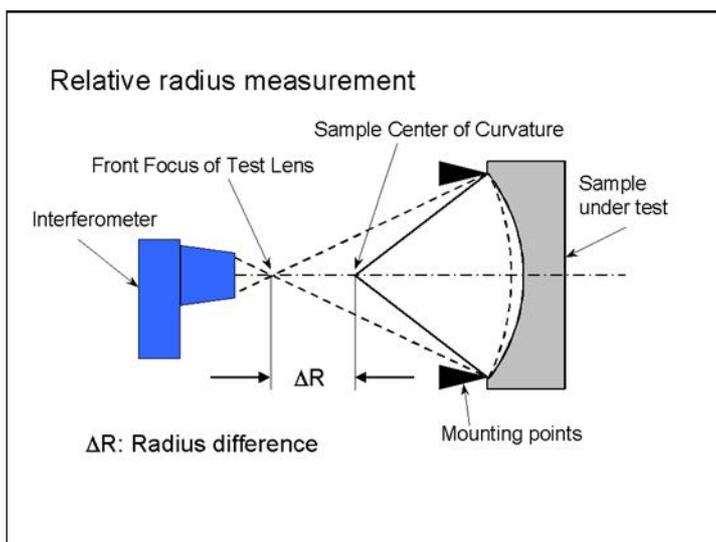
The μShape interferometer software is able to determine the radius of an interferometrically measured sample. Two different possibilities of radius measurement are implemented: relative and absolute radius measurement.

The particular method to be used is activated in the hardware setup dialog (see right). The relative radius measurement is activated by default if a spherical objective is chosen, the nominal radius (R\_scale) of the sample is given and linear or quadratic fit is selected. To activate the absolute radius measurement the according checkbox has to be checked. For the absolute radius measurement a distance measurement system (position gauge) is needed (e.g. μPhase FS10 or Heidenhain system).



### 1 Relative Radius Measurement

This method determines the sample radius relatively. It can be used when a master piece with known radius is available. In this method the interferometer is calibrated with this master piece

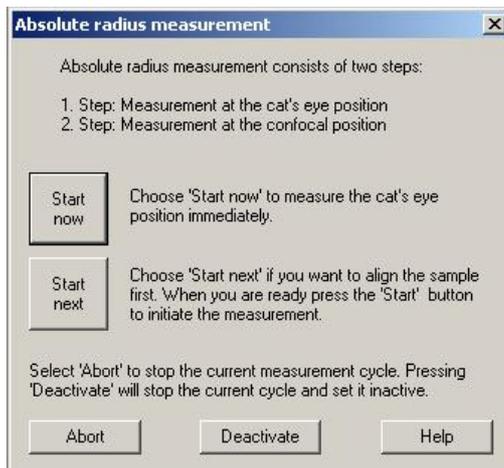
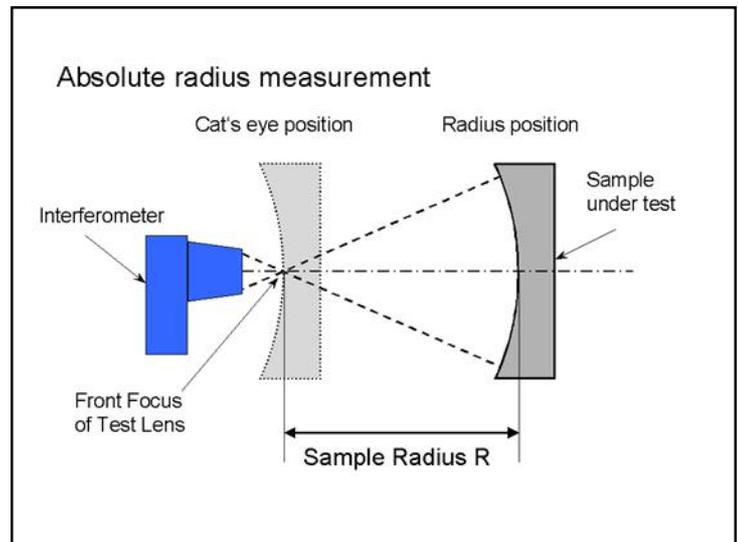


and the nominal radius must be set into the software as sample radius. The test samples are inserted in the same mount as the master piece. Master piece and test samples must be fixed on the surface to be measured and re-alignment between calibration and measurement is not permitted. Then radius deviations of the test samples from the master piece result in defocus effects. From the known parameters of the test objectives and the nominal radius the radius difference can be calculated and displayed together with other statistic values.

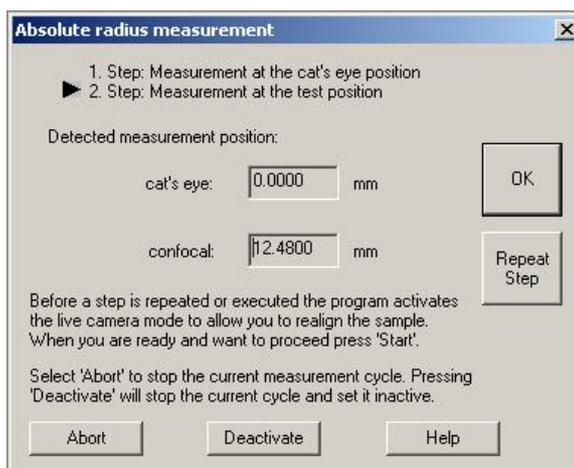
For correct calculation of relative radii a special measurement set-up is necessary. Very suitable is the μPhase<sup>®</sup> SpheroUP configuration where the samples are placed in a gravitation carrier ring on top of the system (see [www.trioptics.com](http://www.trioptics.com) for more details).

## 2 Absolute Radius Measurement

The sample radius is determined from two measurements of the sample - in the cat's-eye and the test position (confocal or radius position). When this option is activated in hardware setup dialog first the value for the sample radius is set to zero. By starting the next measurement (via 'Start' button on toolbar or 'Space' button on keyboard) a short guideline (see first dialog below) is presented. Following the instructions, the software will take two measurements (first in cat's eye then in radius position) and calculate the absolute radius from the position values and power correction of the two measurements. These values are either read from a connected position gauge (μPhase FS system or Heidenhain) or must be put in manually.



It is strongly recommended to align the sample in the confocal position first and then move to the cat's-eye position to pass the measurement cycle without any re-alignment. This approach avoids errors due to misalignment in the cat's eye position. After each measurement the second guideline dialog (second dialog left) is displayed and the encoder value has to be entered into the corresponding field. With "Repeat step" the current measurement can be repeated. Press "Finish" to accept the measurement and to start the calculation of the radius value. It is calculated from the entered encoder positions and the power correction terms in both positions.



The next time a measurement is started a new radius measurement cycle begins. Radius measurement can be deactivated by the "Deactivate" button in the guideline dialogs as well as in the hardware setup dialog by un-checking the radius measurement checkbox.

The results of the radius measurement are part of the statistical parameters and can be displayed in the statistics window. To display them open a statistic window of the result window (surface deviation or wave aberration). Open the context menu (right click) and select the desired parameters from the "Aperture and radii" tab.

Note: The sign of radius is correct only when the z position value of the encoder system becomes larger when shifting a convex surface from the radius position to the cat's eye position (or smaller when a concave surface is shifted from radius to cat's eye position).

If you need more information don't hesitate to contact us at [software@trioptics-berlin.com](mailto:software@trioptics-berlin.com).