

Defining the “Scope” of the wavefront standard.

What issues should be considered as well as neglected when defining the scope for creating a wavefront standard? The first necessary step on the path to an adopted wavefront standard is a scope statement that will act as a guideline for setting the boundary's.

Issues to be considered or neglected when writing the wavefront standard. This is a list of issues that were raised at the June 25th meeting in Boulder.

- Managing the calibration of the measuring instrument
- Management of the uncertainty
- Focusing of the interferometer
- PSD; yes or No
- Specific types of errors to be defined
- Definitions of error types
- RMS of the slope and it's measure of the point spread function(PSF)
- Environmental effects (temperature, pressure, humidity, vibration etc. etc.)
- Polarization effects on the measurement
- Noise sources that degrade the integrity of the measurement.
- Aperture shape and size
- Distortion

The goal for the task force is to produce a practical, concise, and understandable wavefront standard that will be adopted by the US optics community. It is not the team's intent to produce a standard that will catch all possible wavefront measurement applications, but rather to address the mainstream needs of the optics community. It is the intent of the task force to produce a unified document that can serve as a standard for communicating and articulating basic wavefront requirements and measurement capabilities.

The ISO 10110-5 and 10110-14 standards on form and wavefront serve as a good starting point to creating a United States standard. These two documents should be referenced as well as modified, where appropriate, when arriving at the final content contained in the US standard.

Current “Scope” for ISO 10110-5 and 10110-14

10110-5 Surface Form Tolerances

Scope

ISO 10110 specifies the presentation of design and functional requirements for optical elements and systems in technical drawings used for manufacturing and inspection

This part of ISO 10110 specifies rules for indicating the tolerance for surface form.

Note 1: The terminology of interferometry is used for the specification of tolerances, and in particular, for the units in which the tolerances are to be specified; however, this does not stipulate that only interferometric methods may be used for the actual testing of optical parts. Other, non-interferometric methods may be used if the results are converted to the units specified here.

This part of ISO 10110 applies to surfaces of both spherical and aspheric form.

Note 2: ISO 10110-12 allows the surface form tolerance for aspheric surfaces to be specified without reference to this part of ISO 10110.

10110-14 Wavefront Deformation Tolerance

Scope

International Standard ISO 10110 applies to the presentation of design and functional requirements for optical elements and assemblies in technical drawings used for manufacturing and inspection.

This part of ISO 10110 gives rules for the indication of the allowable deformation of a wavefront transmitted through - or, in the case of reflective optics, reflected from – an optical element or assembly.

The deformation of the wavefront refers to its departure from the desired shape. The tilt of the wavefront with respect to a given reference surface is excluded from the scope of this part of ISO 10110.

There is no requirement that a tolerance for transmitted wavefront deformation be indicated. If such a tolerance is specified, it does not take precedence over a tolerance for the surface form according to ISO 10110-5. If tolerances for both the surface form and the transmitted wavefront deformation are given, they must both be upheld.