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PHOTONICS
INCORPORATED

BIREFRINGENCE GUIDELINES

Stress within an optical material is normally created during the manufacturing process. This stress, measured with a polarimeter, can create internal instability which may affect final lens requirements. A quantitative measurement of the stress birefringence can be obtained by using the crosspolarized filters and degrees of change in the light path. However, since the reading is a function of thickness (expressed in nm/cm), it is limited in its range.

The following is a guideline to follow for most optical materials:

ANNEALING CATEGORY	RANGE	APPLICATION
Coarse	≥20 nm/cm	Reheat process
Commercial	10 to 20 nm/cm	Sight windows/non-optical parts
Fine	6 to 10 nm/cm	General purpose optics
Precision	4 to 6 nm/cm	High quality optics/systems
Extra precision	≤4 nm/cm	Ultra-high quality systems

The standard formula for converting the reading using a polarimeter is:

Actual degrees of rotation of stage multiplied by 3.3; divided by thickness cm

$$\text{Annealing level} = \frac{(\text{° twist}) (3.3)}{\mu(\text{cm})}$$