

BIREFRINGENCE REFERENCE CHART

Stress within an optical material is normally created during the manufacturing process of the material. This stress can create an internal instability which can affect the ability of the blank to meet certain final lens requirements. This stress within an optical material is typically measured by using a polarimeter. By using the crosspolarized filters and degrees of change in the light path, a quantitative measurement of the stress birefringence can be obtained. Since this reading is a function of thickness (expressed in nm/cm), it is limited in its range. Currently, it is not possible to obtain an accurate reading on parts less than 4mm in thickness using this method.

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

Using a polarimeter the standard formula for converting the reading is:
actual degrees of rotation of stage x 3.3 divided by the thickness in cm

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