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REFRACTIVE INDEX METHOD FOR TRANSPARENT SOLID MATERIALS

Following describes a method for analyzing solid samples, this method is also described in **ASTM Method D 542-50, Index of Refraction of Transparent Organic Plastics.**

Materials Needed:

- ABBE MARK II PLUS, ABBE MARK III or the ARIAS 500 Refractometer may be used.
- Lens Tissue
- Contact Fluid having a higher refractive index than the sample to be analyzed. **NOTE:** *The RI of this fluid MUST be higher than that of the sample in order to obtain an accurate measurement and must be chemically compatible with the sample. Test for chemical compability by applying a small drop of the contact fluid to the solid sample. Allow it to sit for several minutes, and then rinse with a suitable solvent. Chemical attack is indicated by the sample clouding over where the contact fluid was located. Silicone immersion oil used for high power microscope objectives may be used for most samples. Reichert also offers several calibration oils, which may be used, or we can recommend contacting Cargille Laboratories in New Jersey, USA for more information.*
- Cleaning solution such as methanol, which is chemically compatible with the sample as above.



Sample (Piece cut to fit prism on left), Methanol, and Laboratory Tissues

Sample Preparation:

- The sample must be optically flat on two, perpendicular sides.
- Trim the sample to fit onto the lower, measuring prism of the refractometer. The maximum size which will fit on the prism of the refractometer is **12mm Wide X 35mm Long, Height must be a minimum of 2mm.** Minimum width is approximately 5mm, minimum length is approximately 8mm.

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Sample, after cutting to fit prism



Notice sample is polished on all sides

Method:

- Apply a small drop of the contact fluid onto the distal end (the end towards the light source) of the measuring prism. A minimum amount of contact fluid should be used, as excess will cause a poor shadowline image.



- Carefully place the sample onto the measuring prism, taking care to avoid trapping air bubbles within the contact fluid between the sample and prism. The sample should be moved to within approximately 2mm of the edge of the prism toward the light source.
- Position the light source to shine horizontally into the height of the sample.
- Cover the light source with a tissue to diffuse it.

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- Looking through the eyepiece, adjust the shadowline control knob on the right hand side of the instrument until the shadowline comes into the field of view.
- With the shadowline within the field of view, adjust the dispersion correction wheel to eliminate color from the shadowline. Ideally, the shadowline will appear black and have a sharp boundary, with a white/off-white background. If the shadowline is fuzzy, or indistinct you may have applied too much contact fluid.



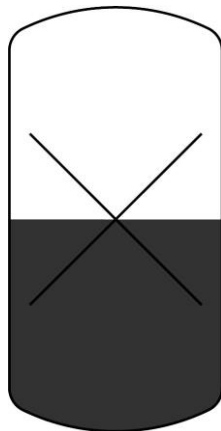
Shadowline control knob.



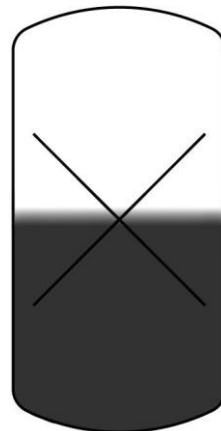
Dispersion correction wheel

- Align the edge of the shadowline with the center of the crosshairs and take your reading.

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*Rendering of sharp,
shadowline as centered on crosshairs as
seen through eyepiece.*



*Rendering of fuzzy
color-free shadowline
seen through eyepiece.*

- Remove the sample and clean the instrument with a suitable solvent, such as Methanol.



If you have any questions or comments, please contact Reichert's Analytical Instruments Division technical support at 716-686-4500 in Buffalo, New York USA.