Frequently Asked Questions

Q: How can I calculate the refractive index of a lens?

Sometimes it would be helpful to know the refractive index of a lens that is being worn by a patient. Perhaps when a lens has been broken and needs to be replaced in an index that will match the other eye? We can't directly measure the refractive index and identify the material, but there are things that we can measure and these can be used to calculate the index.

A: Measure the lens power and the front & back curvatures.

Using a Vertometer (Focimeter) measure the lens power. Then use a Geneva Lens Clock (Lens Measure) to measure the front and back curvatures. the formula for the material refractive index is then as follows . . .

$$n_t = \frac{F_t(n_m - 1) + 1}{F_1 + F_2}$$

Where:

n_t = F_t (nm -1) +1 F_1 + F_2
n_t = **True Refractive Index**
n_m = **Calibration Index of the Lens Clock**
(see instrument face - usually 1.530 or 1.523) Ft = Lens Back Vertex Power
F_1 = **Front Curve (within 0.12D - usually positive)**
F_2 = **Back Curve (within 0.12D - usually negative)**

EXAMPLE:
Lens power is measured as +3.00D and the curves are +6.00D and -3.37D as measured with a 1.523 lens Clock. The calculation is then as follows . . .

n_t = (3 x (1.523 - 1) / (6 - 3.37)) + 1 = (3 x 0.523 / 2.63) + 1
= (1.569 / 2.63) +1
= 0.597 + 1
= 1.597 (rounds to 1.60)

NOTE: Results will vary if the lens surface is aspheric or if the measurements of curvature or power are inaccurate.