



## Clinically Noticeable Chromatism\*

### Inputs:

1: Lens Power: Sph                       3: Refractive Index

2: Lens Power: Cyl

### Calculations:

$B \div 2 = D$

$D + A = E$  (The Sphere Equivalent)

Look Up the Abbe Value from table below:

### Result:

$F \times 2.5 = G \div E = H$

If H is a negative                      Drop minus sign                      =

*This result is the distance from optical centre (mm) to produce clinically noticeable chromatism*

\* Threshold for clinically noticeable chromatism in this calculation is 0.25D.

LOOKUP TABLE - ABBE VALUES			
1.50 Glass	58.9	1.56 Resin	38.0
1.60 Glass	42.0	1.57 Resin	35.0
1.60 PGX Glass	42.0	1.58 Resin	33.9
1.70 Glass	37.2	1.59 Polycarbonate	31.0
1.80 Glass	34.4	1.60 Resin	42.0
1.90 Glass	30.4	1.61 Resin	42.0
1.50 Resin	58.0	1.67 Resin	34.0
1.53 Trivex	45.0	1.71 Resin	36.0
1.54 Resin	47.0	1.74 Resin	33.0

### Legend:

Input                       Interim                       Final

(All distances are expressed in mm)

## Example

In this example the patient has a prescription of -6.50/-1.00 and is wanting to use a high index material. Will they notice colour aberrations in the periphery?(rainbows & fringes at the edges peripheral .

The calculation is important because chromatic aberrations can produce noticeable coloured fringes (or rainbows) along the edges of things when a patient looks through the periphery of their lenses.

This is more of a problem in higher lens powers and with higher index materials, where the Abbe value is lower.

In this example the patient would not notice chromatism until they were viewing more than 15mm away from the centre of the lenses (a lens area of 30mm diameter). If the patient normally turns their head this should not be a clinical problem.



### Clinically Noticeable Chromatism\*

#### Inputs:

- 1: Lens Power: Sph -6.50 <sub>A</sub>      3: Refractive Index 1.60 <sub>C</sub>
- 2: Lens Power: Cyl -1.00 <sub>B</sub>

#### Calculations:

$$B \quad \text{span style="border: 1px solid black; padding: 2px;">-1.00} \quad / 2 = \quad \text{span style="border: 1px solid black; padding: 2px;">-0.50} \quad \text{D}$$

$$D \quad \text{span style="border: 1px solid black; padding: 2px;">-0.50} \quad + A \quad \text{span style="border: 1px solid black; padding: 2px;">-6.50} \quad = \quad \text{span style="border: 1px solid black; padding: 2px;">-7.00} \quad \text{E} \quad \text{(The Sphere Equivalent)}$$

Look Up the Abbe Value from table below:

$$\text{span style="border: 1px solid black; padding: 2px;">42.0} \quad \text{F}$$

#### Result:

$$F \quad \text{span style="border: 1px solid black; padding: 2px;">42} \quad \times 2.5 = \quad \text{span style="border: 1px solid black; padding: 2px;">105} \quad \text{G} \quad / E \quad \text{span style="border: 1px solid black; padding: 2px;">-7} \quad = \quad \text{span style="border: 1px solid black; padding: 2px;">-15} \quad \text{H}$$

✔ If H is a negative      Drop minus sign      =      15 <sub>H</sub>

*This result is the distance from optical centre (mm) to produce clinically noticeable chromatism*

\* Threshold for clinically noticeable chromatism in this calculation is 0.25D.

LOOKUP TABLE - ABBE VALUES			
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#### Legend:

Input         Interim         Final   

(All distances are expressed in mm)