Compensated Powers
(and other ophthalmic conundrums)

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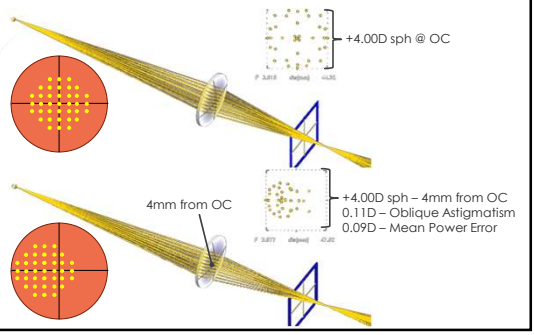
Same Lens- Different Results



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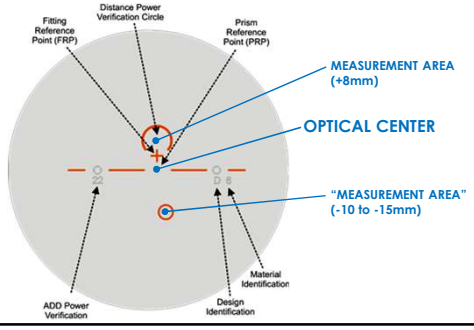
PALs are not measured @ OC



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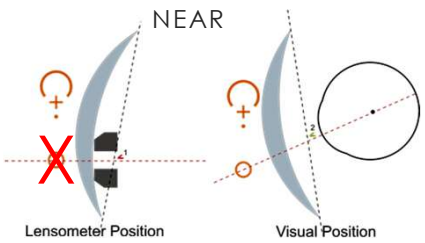
PALs are not measured "in position"



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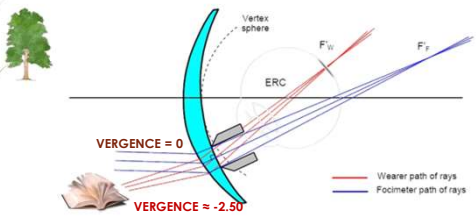
PAL as measured by a lensometer…



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Measured vs. Worn Conditions

ANGLE (°)	SPHERE (D.)	CYLINDER (D.)	AXIS (°)
0	4.00	0.00	-
3	3.99	0.01	90
6	3.94	0.04	90
9	3.87	0.10	90
12	3.77	0.17	90
15	3.64	0.27	90

Measured focimeter powers of an as-worn +4D. SV calculated lens taking into account a tilt of ANGLE.

Has the power really been "compensated" (changed)?
No. The lens is still a +4.00 sph.
"Compensated" power indicates how the lensometer will see the lens.

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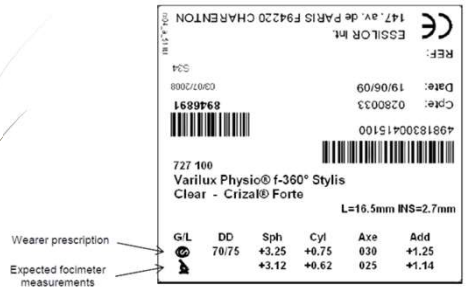
Measured power ≠ ordered power



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Communicating Compensation

Simple demonstration…

ANGLE (°)	SPHERE (D.)	CYLINDER (D.)	AXIS (°)
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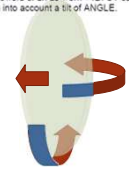
Measured focimeter powers of an as-worn +4D. SV calculated lens taking into account a tilt of ANGLE.



Take a +4.00 spherical lens, and measure with different amounts of tilt.

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Compensated Powers

"Compensation" does NOT change the ordered power…

…compensation indicates how the ordered power will be seen by the lensometer!

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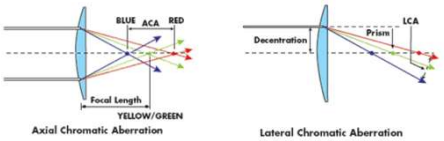
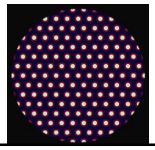
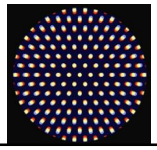
What is Chromatic Aberration?



ACA = $\frac{\text{POWER}}{\text{ABBE}}$

LCA = $\frac{\text{PRISM}}{\text{ABBE}}$





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Abbe Value and Chromatic Aberration

Abbe Facts (Fabbies ☺)

- Plano lenses produce ZERO chromatic aberration

$$\text{ACA} = \frac{0}{\frac{\text{POWER}}{\text{ABBE}}} = \frac{0}{\text{(ANY VALUE)}}$$

$$\text{LCA} = \frac{0}{\frac{\text{PRISM}}{\text{ABBE}}} = \frac{0}{\text{(ANY VALUE)}}$$

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Abbe Value and Chromatic Aberration

Abbe Facts (Fabbies ☺)

- Studies show >0.12D CA may be noticeable to some

CR-39 (58) = 0.06Δ LCA = 20/21
Trivex (44) = 0.09Δ LCA = 20/22
Polycarb (30)= 0.13Δ LCA = 20/23
1.60 MR-8 (41)= 0.09Δ LCA = 20/22
1.67 MR-7 (32)= 0.12Δ LCA = 20/23

LCA = $\frac{3.75}{\frac{\text{PRISM}}{\text{ABBE}}}$

Chromatic Aberration is NOT an issue in ANY material (for 93.7% of wearers at least)!

LATERAL CA	VISUAL ACUITY
0.05 Δ	20/21
0.10 Δ	20/22
0.15 Δ	20/24
0.20 Δ	20/26
0.25 Δ	20/28
0.30 Δ	20/31
0.35 Δ	20/34
0.40 Δ	20/39
0.45 Δ	20/44
0.50 Δ	20/51
0.55 Δ	20/60
0.60 Δ	20/75

Effect of Chromatic Dispersion of a Lens on Visual Acuity.
Meslin, D. & Obrecht, G.
Am. J. of Optom. & Physiol. Optics. 65:25-28, 1988.)

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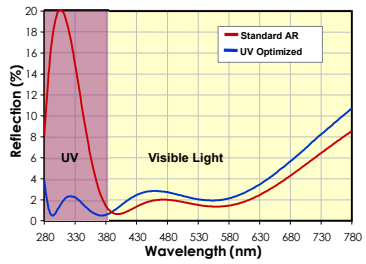
No-Glare & UV



Imagine the result if a no-glare coating created UV reflections IN PHASE with each other…

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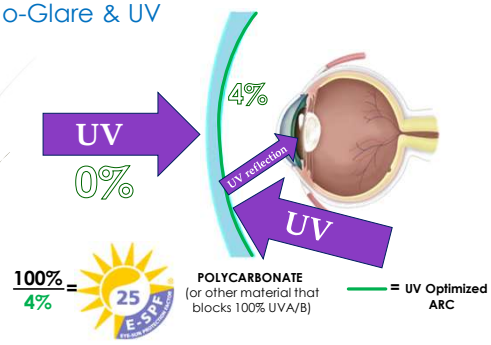
No-Glare & UV



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5.1 General

Both uncut and edged finished lenses shall meet the following requirements. For lenses produced with compensations to account for as worn correction, the tolerances in the tables in clause 5 apply to those values specified by the manufacturer and not to the prescribed RX.

5.1.1 Distance Refractive Power (Back Vertex Power)

5.1.1.1 Single Vision and Multifocal Lenses

Table 1 – Tolerance on Distance Refractive Power (Single-Vision and Multifocal Lenses)

Sphere Meridian Power	Tolerance on Sphere Meridian Power	Cylinder ≥ 0.00 D ≤ - 2.00 D	Cylinder > - 2.00 D ≤ - 4.50 D	Cylinder > - 4.50 D
From - 6.50 D to + 6.50 D	± 0.13 D	± 0.13 D	± 0.15 D	± 4%
Stronger than ± 6.50 D	± 2%	± 0.13 D	± 0.15 D	± 4%

5.1.1.2 Progressive Addition Lenses

Table 2 – Tolerance on Distance Refractive Power (Progressive Addition Lenses)

Sphere Meridian Power	Tolerance on Sphere Meridian Power	Cylinder ≥ 0.00 D ≤ - 2.00 D	Cylinder > - 2.00 D ≤ - 3.50 D	Cylinder > - 3.50 D
From -8.00 D to + 8.00 D	± 0.16 D	± 0.16 D	± 0.18 D	± 5%
Stronger than ± 8.00 D	± 2%	± 0.16 D	± 0.18 D	± 5%

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