

Frame Styling with Science and Savvy to Minimize Thickness and Maximize Patient Delight

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An easy way to think about approximate thickness:

Maximum Thickness = Lab Minimum Thickness + (Thickness factor x Power)

Where:

Material	Index of Refraction	Thickness Factor by ED				
		40mm	45mm	50mm	55mm	60mm
CR-39	1.50	.40	.51	.63	.76	.90
Crown Glass	1.52	.38	.48	.60	.72	.86
Trivex	1.53	.37	.47	.58	.70	.83
Polycarbonate	1.586	.34	.43	.53	.65	.77
1.60/MR-8	1.60	.33	.42	.52	.63	.75
1.67	1.67	.30	.38	.47	.57	.68
1.70	1.70	.29	.36	.45	.54	.64
1.74	1.74	.28	.34	.43	.51	.60

And Power of the lens is the highest total power of the lens. It will be at either the prescribed meridian or 90 degrees from it.

More precisely:

Plus Lens: Center Thickness is the Edge thickness + Sagittal Thickness

Minus lens: Edge thickness = Center thickness + Sagittal Thickness

Edge Thickness or Center Thickness are dictated by the lab and are usually around 1.7mm – 2.0mm for lenses *that do not require a groove or drilling*.

Sagittal Thickness Formula:

$$\text{Sagittal Thickness} = \left(\frac{1}{2} \text{ Diameter}\right)^2 \cdot |\text{Focal Power}| / 2000 \cdot (\text{Index} - 1)$$

where:

Diameter is the total diameter of the lens at its greatest distance

Focal Power is the total power of the lens at its highest absolute value

Index is the Index of Refraction of the material

Prism Thickness:

Which power to use?

For In/Out Prism, use power at the 180, For Up/Down prism, use power at the 90

Lens/Prism	Thickest At
Minus/Base In	Temporal
Minus/Base Out	Nasal
Minus/Base Up	Top
Minus/Base Down	Bottom
Plus/Base In	Nasal
Plus/Base Out	Temporal
Plus/Base Up	Bottom
Plus/Base Down	Top

FORMULA:

WITH PRISM:

Add ½ prism base thickness to the lens thickness prior to prism calculations

Prism Base Thickness:

$$t = (dP)/100(n - 1)$$

where:

n is the index of refraction of the material

t is the sagittal thickness, in mm of the lens without prism (run through the above formula)

d is ED of frame in digitally surfaced lenses or the diameter of the lens in traditionally surfaced lenses

P is the Diopters of Prism/Prism Power.

Then add the lab prescribed minimum thickness in a plus lens or the edge thickness before prism of a minus lens.

STYLING:

When looking at a patient's Rx, first determine at which angle in each lens the greatest thickness will occur. It will either be at the prescribed axis or 90 degrees away from that prescribed axis. Remember that when looking at the patient, 0 degrees is always on the right side of the lens, 180 is on the left side of the lens. (Zero is nasal OD and temporal OS).

To minimize thickness, choose a frame that has the smallest radius at the thickest part of the lens.

Assert your skills to let your patient know what shapes will work best for their Rx and balance the remaining with good decentration, hiding thickness with appropriate frames, and lens materials.

RESOURCES:

Online Thickness Calculators:

[OptiCampus.com - OptiCampus Optical Calculators](https://www.opticampus.com/optical-calculators)

infortix.ca/calc/EnThick.aspx

[Opticare | Envision the Possibilities | Optiedge](#)

Apps:

Optica-App: Free (Cool Graphic Display of thickness at multiple points on the lens)

Lens Thickness by GlassifyMe \$6.99 (Google Devices)

Optical Calculator: Pricey Subscription model \$4.99/mo

Lens Calc – Optical Dispensing \$1.99

None of the online calculators or apps I found have a prism component. Let me know if you find one!