



**EVIDENCE-BASED CLINICAL
PRACTICE GUIDELINE**

**RECOMMENDED LENS
TOLERANCES**

Effective March 1, 2015

Revised June 16, 2021



Recommended Lens Tolerances Clinical Practice Guideline

The objective of this Clinical Practice Guideline (CPG) is to provide guidance to Doctors of Optometry on appropriate ophthalmic lens tolerances. This guideline is based on the best available and most current ophthalmic, optometric and medical clinical evidence and research.

Minimally acceptable lens tolerances are required to ensure that patients achieve comfortable, clear and healthy vision. All dress prescription ophthalmic lenses must meet the minimum tolerances as set out in this guideline and those of ANSI Z80.1-2015. All occupational safety lenses, safety frames and sports spectacles / goggles must meet the minimum tolerances as set out in this guideline and those of ANSI Z94.3.

Over-the-counter (OTC) reading glasses and magnifiers purchased via self-selection by patients are exempt from this Clinical Practice Guideline. Verification of aberration-correcting and other similar lenses require specialized equipment (e.g. Iprofiler, etc.) and adaptation of these tolerances.

1. Tolerance on Distance Refractive Power – Single Vision and Multifocal Lenses

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

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

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

3. Tolerance on Cylinder Axis

Cylinder Power (D)	< 0.12D	≥ 0.12D ≤ 0.25D	≥ 0.25D ≤ 0.50D	≥ 0.50D ≤ 0.75D	≥ 0.75D ≤ 1.50D	≥ 1.50D
Tolerance of Axis	Undefined	± 14°	± 7°	± 5°	± 3°	± 2°

4. Tolerance of Multifocal Prescriptions

- a. Segment Power**
 - i.** Within ± 0.12 D if the prescribed ADD is less than 4.00, or within ± 0.18 D if the prescribed ADD is greater than 4.00.
- b. Segment Size**
 - i.** Within ± 0.5 mm. of the prescription.
 - ii.** Pair must be symmetrical on visual inspection, unless otherwise specified.
- c. Segment Location**
 - i.** Within ± 1.0 mm. of the prescription.

5. Tolerance of PAL Prescriptions

- a. ADD Power**
 - i.** Within ± 0.12 D if the prescribed ADD is less than 4.00, or within ± 0.18 D if the prescribed ADD is greater than 4.00.
- b. Segment Height**
 - i.** Within ± 1.0 mm. of the prescription

6. Prism Power and Location

- a. Prism Measured at the Major Reference Point (MRP)**
 - i.** Must be within 0.25 prism diopter for each lens (horizontally and/or vertically).
- b. Total Horizontal Imbalance**
 - i.** Must be within 0.67 prism diopter for the prescription.
- c. Total Vertical Imbalance**
 - i.** Must be within 0.33 prism diopter for the prescription.

7. Base Curve

- a.** All surface curvatures must be within ± 0.50 ~~0.50~~ 0.75 D of the design specifications of the lens along the principal meridians of the lens.

8. Lens Surface Defects

- a.** No waves, pits, scratches, watermarks, grayness, coating defects, tint irregularities, etc. may be visible to the naked eye as inspected by grazing incidence of beam of light from R40 type bulb.

9. Internal Lens Imperfections

- a.** No bubbles, aberrations, striae, etc. may be visible to the naked eye.

10. Impact Resistance

[a] Dress Eyewear

- Glass lenses must be tempered.
- Minimum thickness = $2.0 \text{ mm} \pm 0.2 \text{ mm}$ measured with a caliper at the thinnest part of the lens.
- The edge thickness must not be less than 1.0 mm at the thinnest part of the edged lens.
- The average thickness between the optical center and the thinnest edge must not be less than 1.7 mm.

[b] Safety Eyewear

- Glass lenses no longer meet the standard for safety eyewear.
- Minimum thickness = $3.0 \text{ mm} \pm 0.2 \text{ mm}$ measured with a caliper at the thinnest part of the lens.

NOTE: The current impact resistance standard requires all treated glass and plastic lenses to be able to withstand the impact of a 5/8 inch steel ball dropped from a height of 50 inches. The test is to be conducted at room temperature with the lens supported by a plastic tube (1 1/4 inch outside diameter, 1 inch inside diameter and a 1/8 inch neoprene gasket on the top edge of the plastic tube.