

AS/NZS ISO 21987:2011 Ophthalmic optics - Mounted spectacle lenses (Abridged)

SINGLE VISION & MULTIFOCALS LENSES

Back vertex power			Tolerance				
			Each (i) meridian	Tolerance on cylinder power			
				≥0.00 to ≤0.75	>0.75 to ≤4.00	>4.00 to ≤6.00	>6.00
D	D	D	D	D	D		
0.00	to	+/-3.00	+/-0.12	+/-0.12	+/-0.09	+/-0.12	+/-0.18
+/-3.25	to	+/-6.00	+/-0.12	+/-0.12	+/-0.12	+/-0.12	+/-0.18
+/-6.25	to	+/-9.00	+/-0.12	+/-0.12	+/-0.12	+/-0.18	+/-0.18
+/-9.25	to	+/-12.00	+/-0.18	+/-0.12	+/-0.12	+/-0.18	+/-0.25
+/-12.25	to	+/-20.00	+/-0.25	+/-0.18	+/-0.18	+/-0.25	+/-0.25
More than		+/-20.00	+/-0.25	+/-0.25	+/-0.25	+/-0.25	+/-0.37

(i) This tolerance is on the basic vertex power

AXIS

Cylinder power	Tolerance
D	(°)
≥0.125 and ≤0.25	+/-16
>0.25 and ≤0.50	+/-9
>0.50 and ≤0.75	+/-6
>0.75 to ≤1.50	+/-4
>1.50 to ≤2.50	+/-3
>2.50	+/-2

ADD POWER

Addition	≤4.00	>4.00
Tolerance	+/-0.12D	+/-0.18D

PROGRESSIVE & DEGRESSIVES LENSES

Back vertex power			Tolerance				
			Each (i) meridian	Tolerance on cylinder power			
				≥0.00 to ≤0.75	>0.75 to ≤4.00	>4.00 to ≤6.00	>6.00
D	D	D	D	D	D		
0.00	to	+/-6.00	+/-0.12	+/-0.12	+/-0.18	+/-0.18	+/-0.25
+/-6.25	to	+/-9.00	+/-0.18	+/-0.18	+/-0.18	+/-0.18	+/-0.25
+/-9.25	to	+/-12.00	+/-0.18	+/-0.18	+/-0.18	+/-0.25	+/-0.25
+/-12.25	to	+/-20.00	+/-0.25	+/-0.18	+/-0.25	+/-0.25	+/-0.25
More than		+/-20.00	+/-0.37	+/-0.25	+/-0.25	+/-0.37	+/-0.37

(i) This tolerance is on the basic vertex power

AXIS

Cylinder power	Tolerance
D	(°)
≥0.125 and ≤0.25	+/-16
>0.25 and ≤0.50	+/-9
>0.50 and ≤0.75	+/-6
>0.75 to ≤1.50	+/-4
>1.50 to ≤2.50	+/-3
>2.50	+/-2

ADD POWER

Addition	≤4.00	>4.00
Tolerance	+/-0.12D	+/-0.18D

PRISM IMBALANCE

Highest absolute ordered component prism value	Tolerance on the horizontal component (Relative to the ordered centration distance)	Tolerance of the vertical component (Relative to the ordered centration distance)
≥0.00 to ≤2.00	For powers ⁽ⁱⁱ⁾ ≥0.00 to ≤3.25D - 0.67 ^Δ For powers ⁽ⁱⁱ⁾ >3.25D the prismatic effect of 2.0 mm displacement	For powers ⁽ⁱⁱ⁾ ≥0.00 to ≤5.00D - 0.50 ^Δ For powers ⁽ⁱⁱ⁾ >5.00D the prismatic effect of 1.0 mm displacement
>2.00 to ≤10.00	For powers ⁽ⁱⁱ⁾ ≥0.00 to ≤3.25D - 1.00 ^Δ For powers ⁽ⁱⁱ⁾ >3.25D 0.33 ^Δ + the prismatic effect of 2.0 mm displacement	For powers ⁽ⁱⁱ⁾ ≥0.00 to ≤5.00D - 0.75 ^Δ For powers ⁽ⁱⁱ⁾ >5.00D 0.25 ^Δ + the prismatic effect of 1.0 mm displacement
>10.00	For powers ⁽ⁱⁱ⁾ ≥0.00 to ≤3.25D - 1.25 ^Δ For powers ⁽ⁱⁱ⁾ >3.25D 0.58 ^Δ + the prismatic effect of 2.0 mm displacement	For powers ⁽ⁱⁱ⁾ ≥0.00 to ≤5.00D - 1.00 ^Δ For powers ⁽ⁱⁱ⁾ >5.00D 0.50 ^Δ + the prismatic effect of 1.0 mm displacement

(ii) These tolerances are applied to the lowest power of the lens pairs

SYMBOLS USED IN TABLE	
D	Diopters
(°)	Degrees
<	Less than
>	Greater than
≤	Equal to or less than
≥	Equal to or greater than
ET	Edge thickness
CT	Centre thickness

POSITIONING TOLERANCES

Multifocals
Vertical positions (heights) of segments <ul style="list-style-type: none"> • Within +/-1.00 mm of that ordered • Difference between mounted pair should not exceed 1.00 mm
Horizontal positions of segments <ul style="list-style-type: none"> • Within +/-1.00 mm of ordered monocular centration points • Difference between mounted pair should not exceed 1.00 mm
Segment tilt for straight top or curved top segments <ul style="list-style-type: none"> • Should not exceed 2 degrees
Progressive power and degressive power lenses
Vertical positions (heights) of fitting point <ul style="list-style-type: none"> • Within +/-1.00 mm of that ordered • Difference between mounted pair should not exceed 1.00 mm
Horizontal positions of segments <ul style="list-style-type: none"> • Within +/-1.00 mm of ordered monocular centration points
Alignment marking tilt <ul style="list-style-type: none"> • Should not exceed 2 degrees from the horizontal

THICK

Material	Thickness (mm)		Tolerance +/-0.3mm
	Plus ET	Minus CT	
Low index	0.80	2.00	
Mid index	0.80	1.80	
Polycarbonate	0.80	1.30	
Hi index	0.80	1.50	

Thickness tolerance

- The thickness of the lens may be specified by the manufacturer or can be agreed between the customer and the lens supplier.
- Thickness shall be measured at the reference point of the front surface and normal to this surface. It shall not deviate by more than ± 0,3 mm from the ordered or agreed value .

The full standards is available from:
Standards N.Z www.standards.co.nz

Recommendations on Mounting

APPEARANCE OF THE LENS PAIRS

They should be reasonably matched in:

- a) Shape
- b) Form
- c) Size
- d) Mass
- e) Thickness (unless when necessary)

COLOUR MATCHING

For each pair of lenses, tints and coating should be obviously similar.

GLAZING

Size and Shape:

- a) Size and shape of each pair of lenses should be the same and should correspond to the aperture of the frame.
- b) Care is to be exercised to ensure the spectacle front after fitting is not substantially altered from the pre-glazing shape.
- c) Care must be exercised to ensure the spectacle rim shape, aperture size or bridge shape and dimensions are not altered.
- d) When glazing metal frames, care must be taken to not to damage any protective decorative coating on the metal rim.

Bevel:

It should be smooth, regular, chip, starring and facet free. A safety chamfer on the ridge of the bevel and around both lens edges should be completed.

Lenses for rimless and semi-rimless mounts

- a) Flat-edge lenses should have a smooth finish with a neat safety chamfer around each lens edge (when necessary).
- b) Holes are to be drilled at the correct distance from the edge appropriate to the type of mounting.
- c) Slots and grooves should be accurately positioned.
- d) Brow-bars of semi-rimless mounts should follow the edge of the lens if the frame allows this.
- e) Screw ends should be neatly finished.

Lens mounting in frame

- a) Lenses should be retained securely so that movement or rotation cannot occur under normal conditions of use,
- b) No visible gaps between the lenses and the rim,
- c) In metal frames, the closing block joints retaining the lens should close precisely without noticeable gaps between them.
- d) Lenses in rimless and semi-rimless mounts should be neatly fitted to ensure they are secure in any position,
- e) All fitted and mounted lenses should show no significant strain when examined in a polariscope, strain viewer or stress tester.

Round Lenses

The axis position of round lenses (except for thermally-toughened glass) should be shown by means of a permanent mark placed next to the temporal hinge/rim joint on the back of the lens surface. Right sided has one mark, left side has two marks