EyeSystems

LENSES

Materials, Types and Treatments

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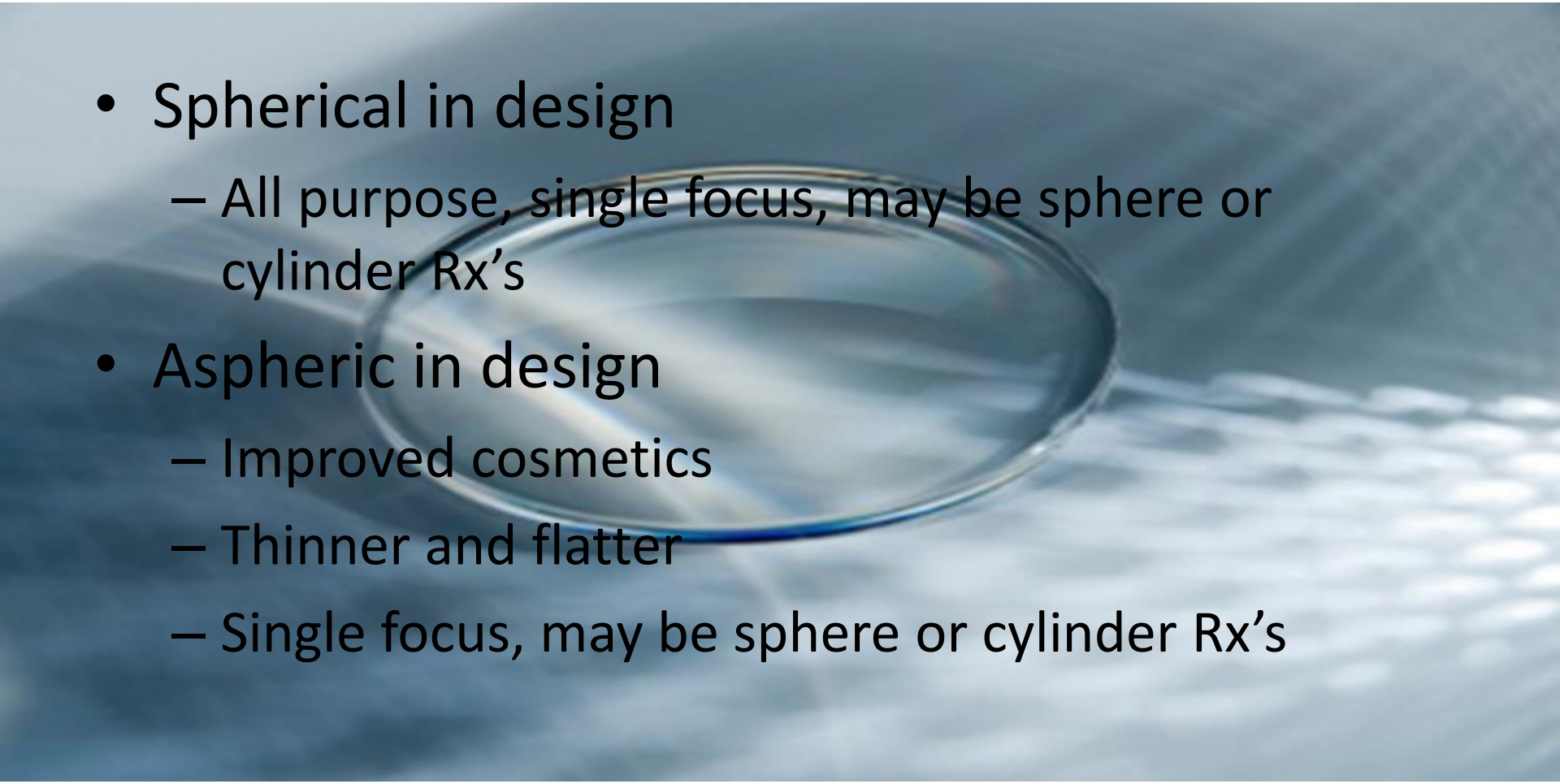
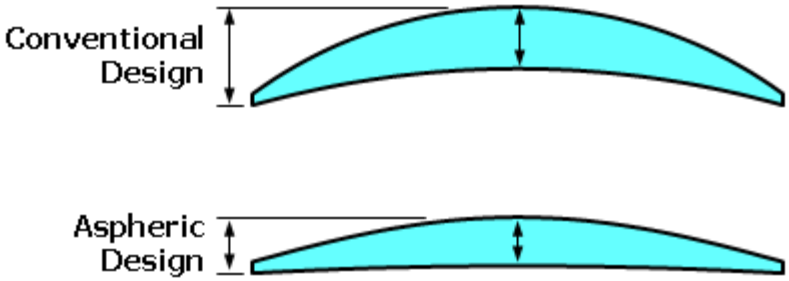
Single Vision



- Spherical in design
  - All purpose, single focus, may be sphere or cylinder Rx's
- Aspheric in design
  - Improved cosmetics
  - Thinner and flatter
  - Single focus, may be sphere or cylinder Rx's

Aspherical Lens Forms

- Aspheric Plus Lenses
  - Flattens in surface curve towards edge (like an egg)
  - All the standard characteristics of spherical plus lenses
    - Thinner in the center than spherical plus lenses
    - Magnify less (thinner & flatter)
    - Less bulbous
    - More asphericity in higher plus lenses
    - Provides good vision

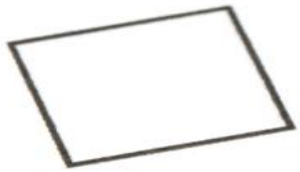


Conventional Versus Aspheric Lens Designs

Aspherical Lens Forms

- Aspheric Minus Lenses
  - Steepens in surface curve towards edge (like a frisbee)
    - Thinner at the edge than spherical minus lenses
    - Minify less in lens periphery
    - Flattened

Choosing the Right Design



- Choice is dependent on
  - Prescription
  - Patient want and need
  - Cost
  - Frame size and shape

Quick Tips – Single Vision

- Fitting and Dispensing
  - Spherical design lenses
    - Monocular PD's
    - OC along frame midline
  - Aspheric lenses
    - Monocular PD's

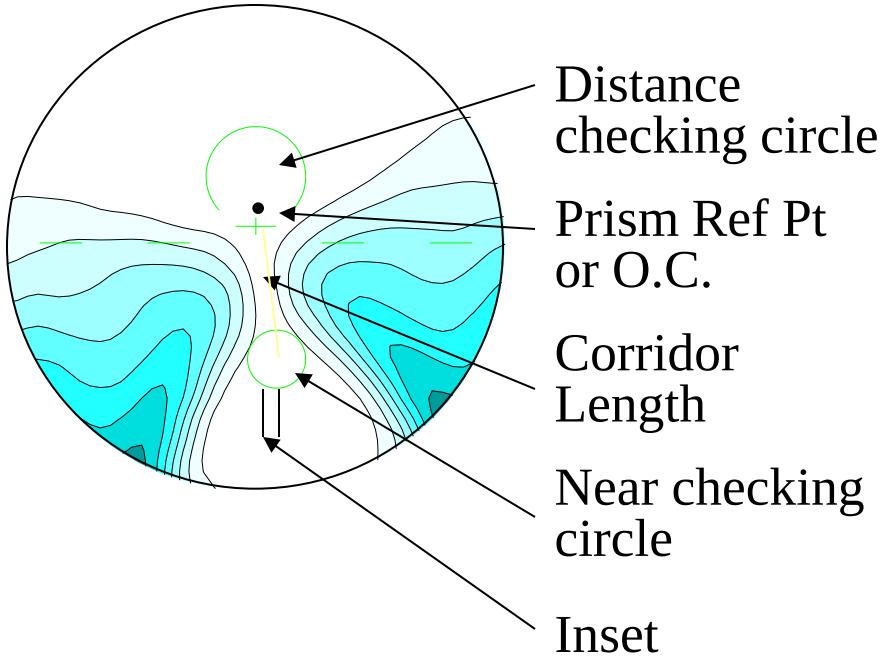
Bifocals

- Flat Top most commonly used
  - Available in 28, 35, 45mm
- Spherical in design
  - All purpose, double focus, may be sphere or cylinder Rx's
- Aspheric in design
  - Improved cosmetics, thinner and flatter
  - Double focus, may be sphere or cylinder Rx's
  - Only distance portion aspheric

Trifocals

- Spherical in design 7x 28
  - All purpose
  - Triple focus; distance, mid-range (arm's length) and near
  - May be sphere or cylinder Rx's

Multifocal Terms



Progressives

General Purpose

- Distance and near and all distances in between
- Blending zones
- Hard and soft designs
- Minimum fitting heights vary by manufacturer

Terminology

FREEFORM PROGRESSIVES

- Digital Surfacing
- Digitized
- Internal Free-Form
- Fingerprint Surfacing
- Customized
- Precise-Form
- Backside/Back Surface
- Dual-Surface
- Wavefront
- Fully Personalized
- HD
- High Definition

Freeform Progressive

- FREEFORM surfacing creates a significant improvement over traditional processing by allowing production within 1/100 of a diopter in accuracy.

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Terminology

Terminology

- "Variable" Progressive –

Corridor length remains the same – reading area changes.

Terminology

- "Fixed" Progressive

  Reading area remains the same – corridor length changes.

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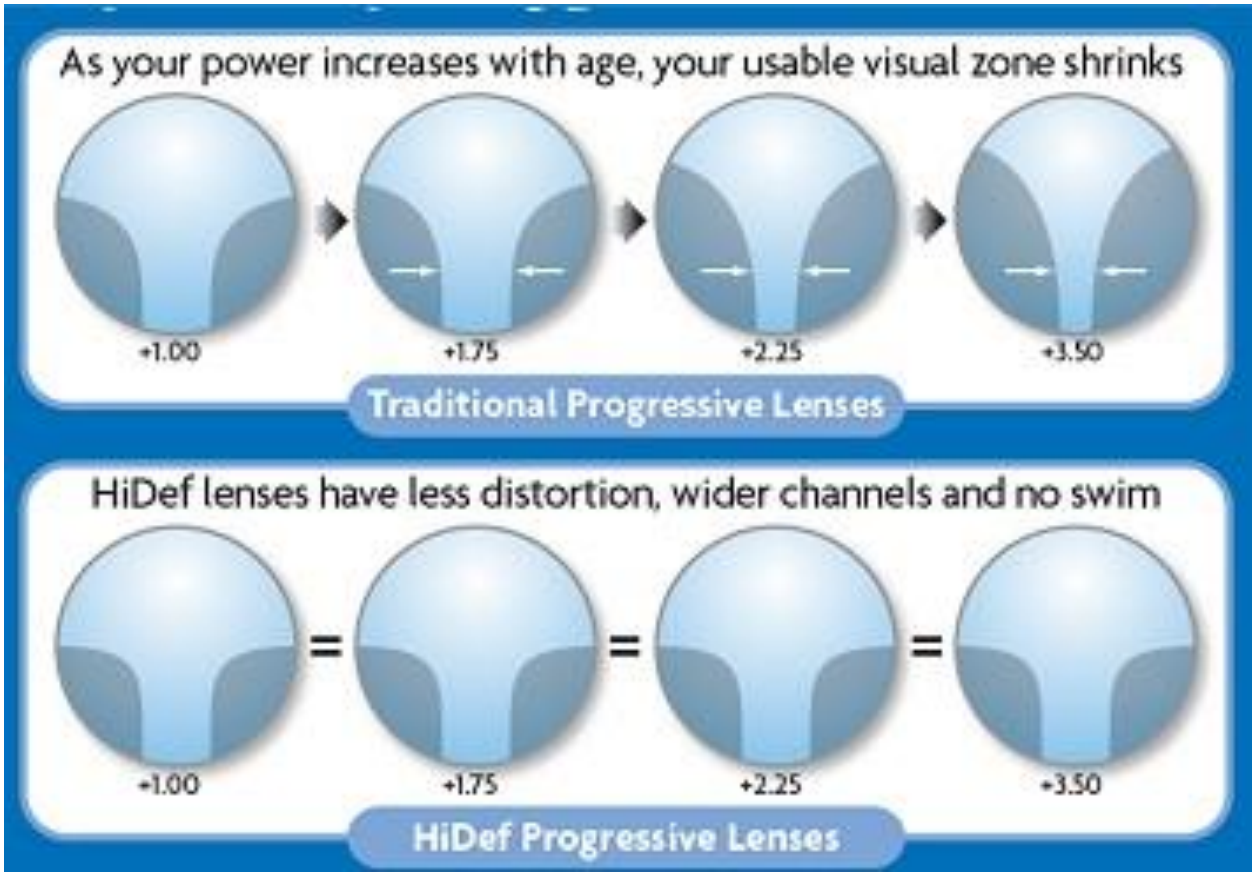
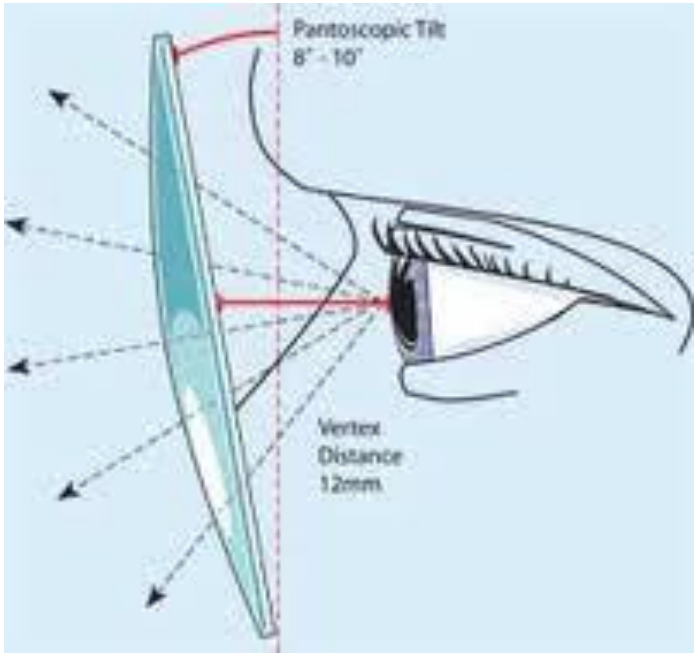
Power Changes and Patient Impact



Considerations for Freeforms

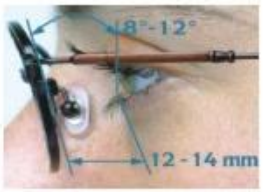
These considerations allow for an optimized wearing experience:

- Pantoscopic angle (PA)
- Vertex or Back Vertex Distance (BVD)

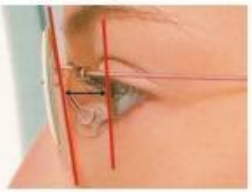


Usage:

A



B



C

Picture A:First try to select appropriate Frame that suits face and Rx then and adjust it on the patient`s face before taking the measurement. Measure the PA as shown; you will get the Pantoscopic Angle(PA) with the needle.Adjust the Frame if required to achieve recommendation for patients comfort.

Picture B: For best results, Specially for Progressive Addition Lenses it is necessary to have Patient`s IPD along with BVD and PA.
BVD:Recommended as minimum as possible
PA: 8° to 12° average 10°(recommended)

Picture C: The(BVD) Back Vertex Distance is the distance between the back of a correcting lens and the Cornea. The Scale for the BVD allows the measurement from both sides as the Zero is placed in the middle.

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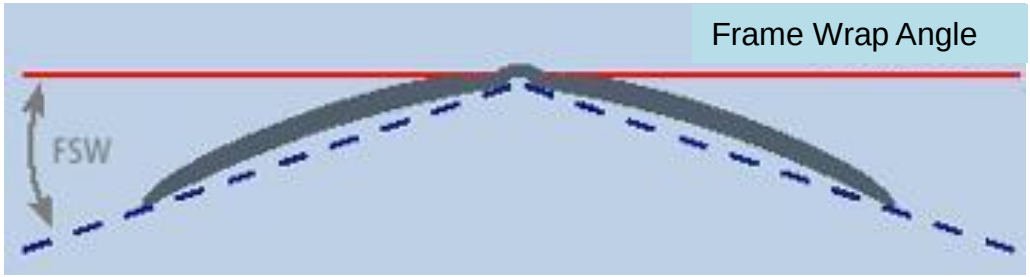
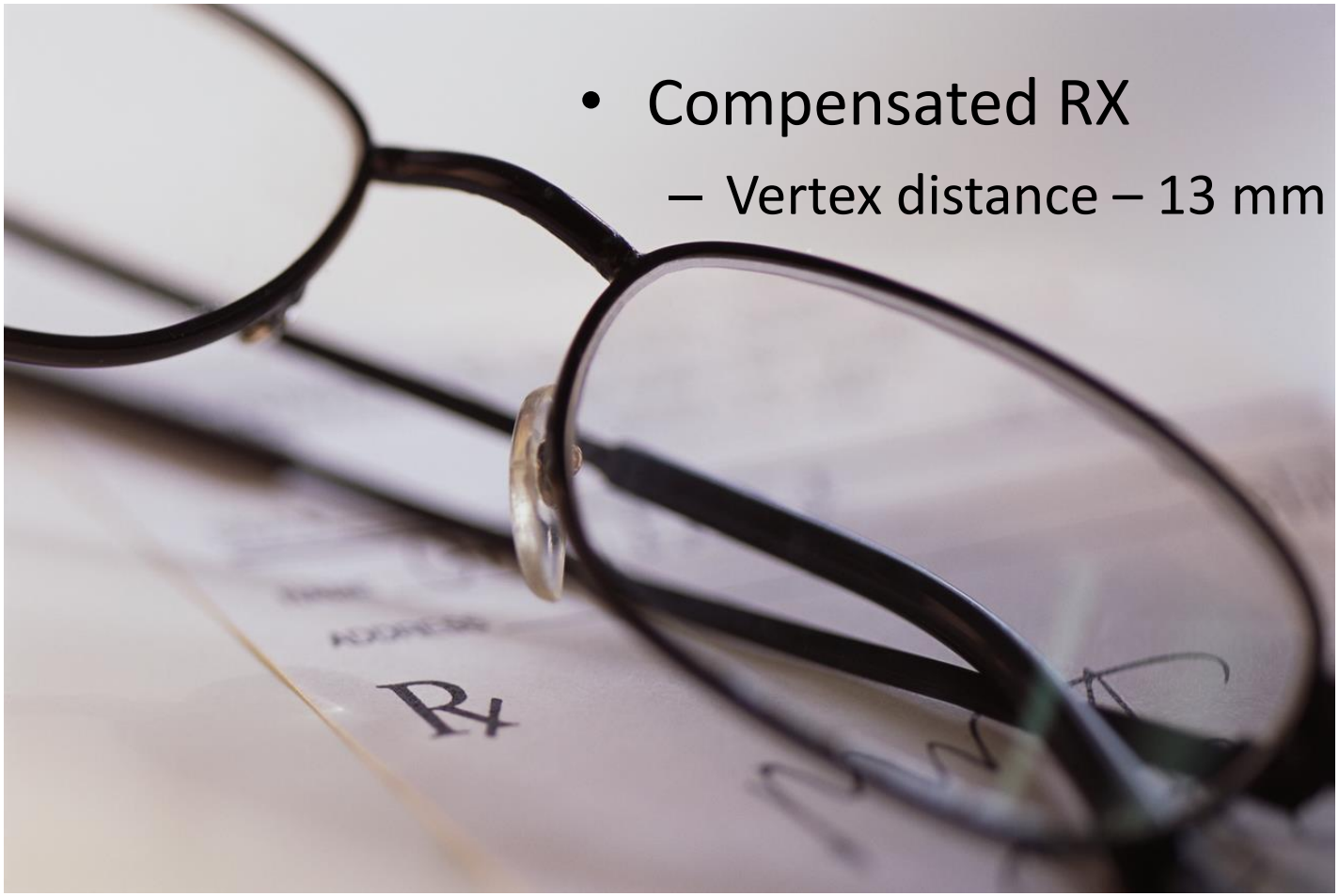
Measuring Vertex Distance

Considerations for Freeforms

- Panoramic angle and wrap



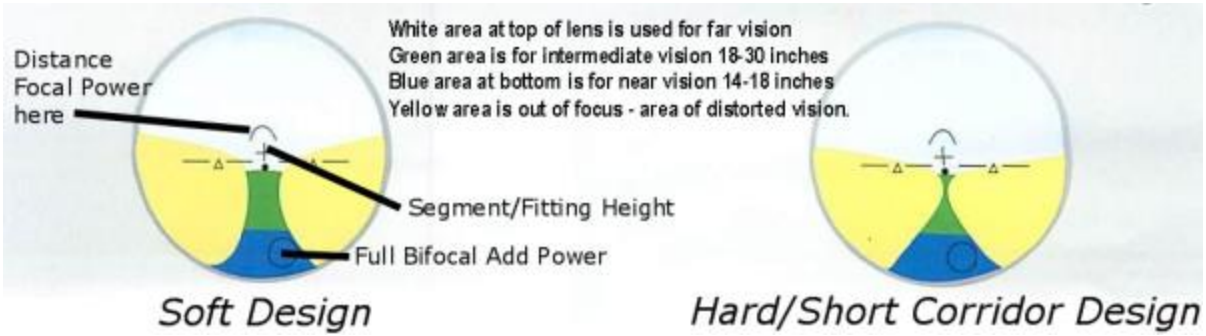
Considerations for Freeforms



- Compensated RX
  - Vertex distance – 13 mm

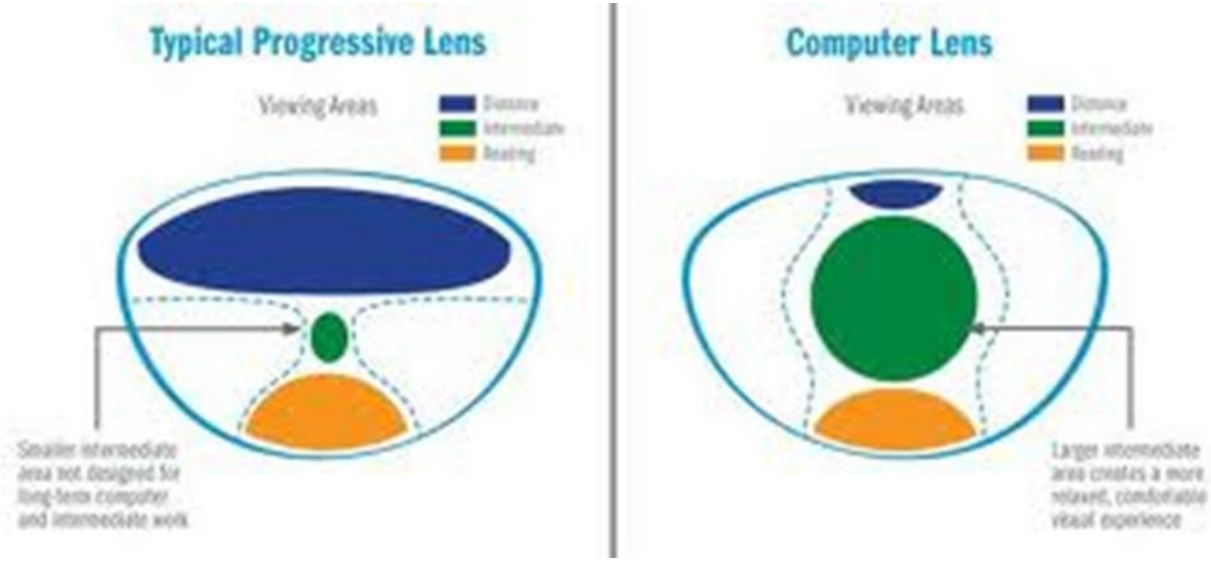
Progressives

- Short Corridor
  - Designed for frames with narrow vertical dimensions

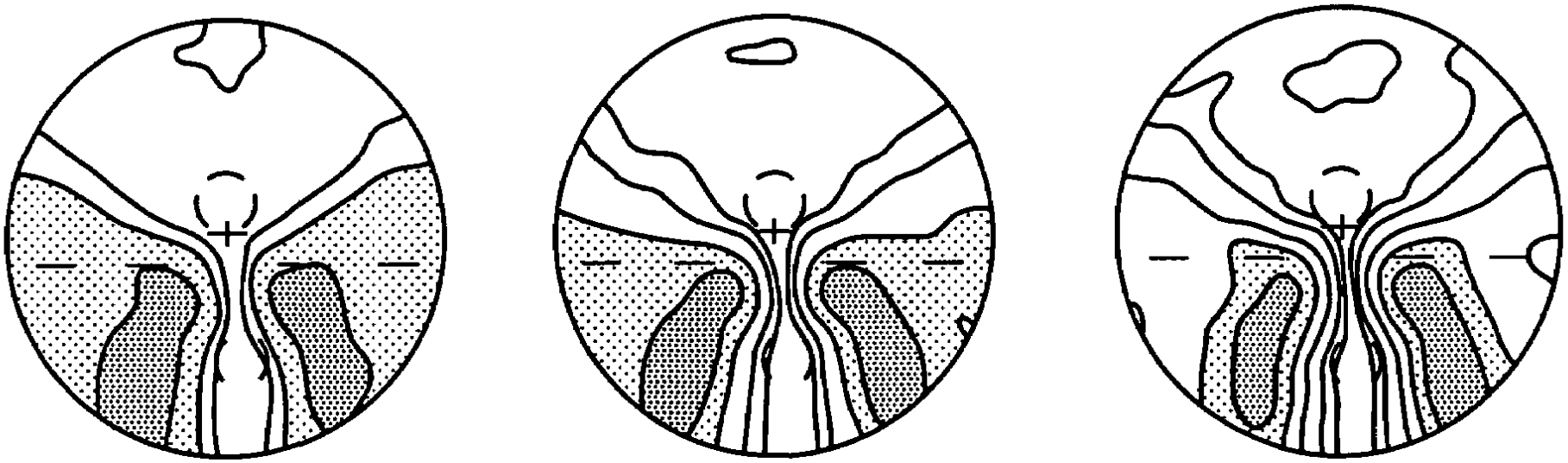


Progressives

- Computer
  - Designed for increased mid-range viewing
  - Often do not have distance portion
  - Require deeper frames for best vision

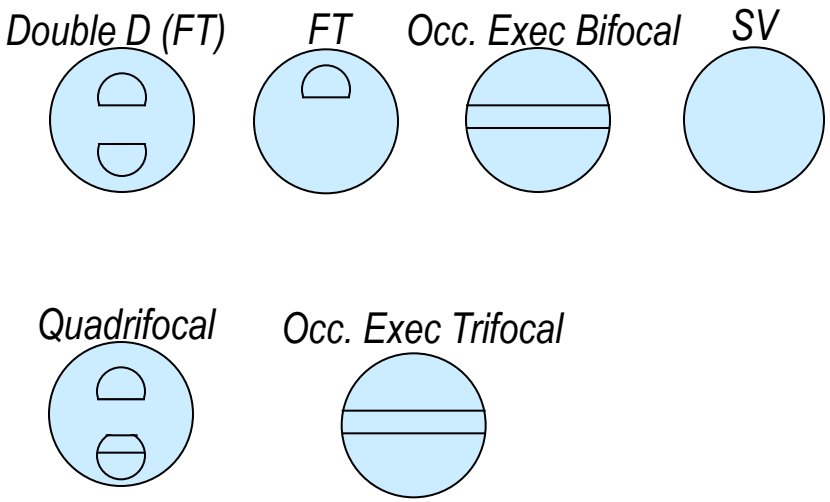


Comparision



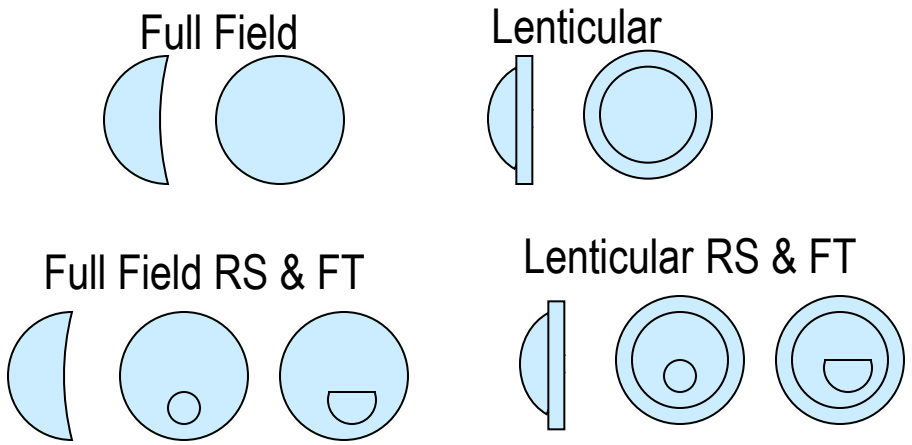
Lens Forms

- Occupational lenses
  - Create custom eyewear to meet occupational needs
- Occupational SV and bifocals
  - Distance and near, mid-range and near, distance and mid-range
- Occupational trifocals
  - Distance, mid-range and near



Lens Forms

- Cataract and Low Vision lenses
  - Single Vision
    - Full Field, Lenticular
  - Bifocals
    - Full Field, Lenticular



Choosing the Right Multifocal

Glasses Prescription

		Sphere	Cylinder	Axis	Prism	Base
DISTANCE	OD	-4.00			0.5	down
	OS	-5.00	-0.50	180	0.5	up
ADD	OD	+2.00				
	OS	+2.00				

Cost

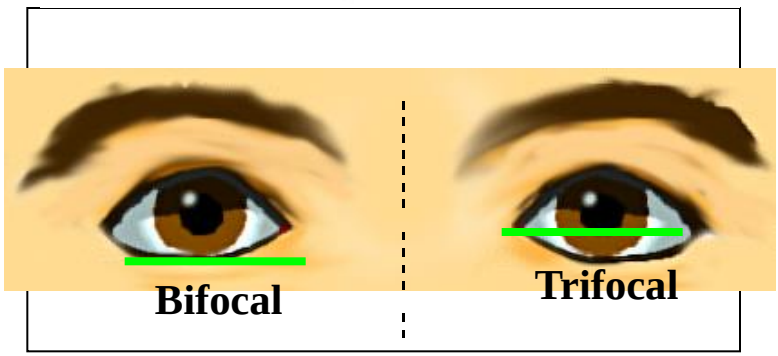
Important Eye Measurement

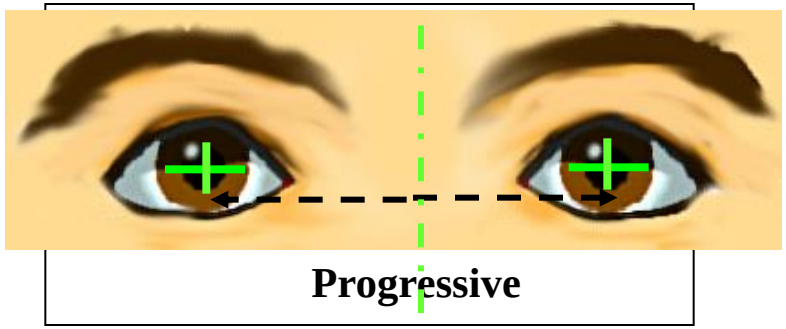
- Interpupillary distance or PD
  - Distance between the visual centers of the patient's two eyes
  - Used for proper centering of lenses
  - Measured best by corneal reflex pupillometer

Quick Tips – Multifocals

Fitting and Dispensing

- Bifocals
  - Binocular distance and near PD's
  - Segment ledge at top of lower lid
  - Same segment height for each lens
- Trifocals
  - Binocular distance and near PD's
  - Segment ledge at bottom of pupil margin
  - Same segment height for each lens
- Progressives
  - Monocular PD's
  - Monocular fitting heights





Sports Lenses

- Protective eyewear
  - High impact Polycarbonate lenses and nearly unbreakable frames
  - UV absorption, special tints
  - High contrast filters; yellow, vermillion
  - Glare control; polarized lenses
  - Wrap frames for wind and dust
- Special designs
  - Out-of-the-way seg for golf

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Lens Materials

Material Choices

- Hard Resin
  - Conventional plastic
  - Good all purpose material, tintable
  - Processed to 2.0mm ct
  - Available in virtually all designs
  - Available with scratch resistant and/or AR coatings
  - Cost **$**

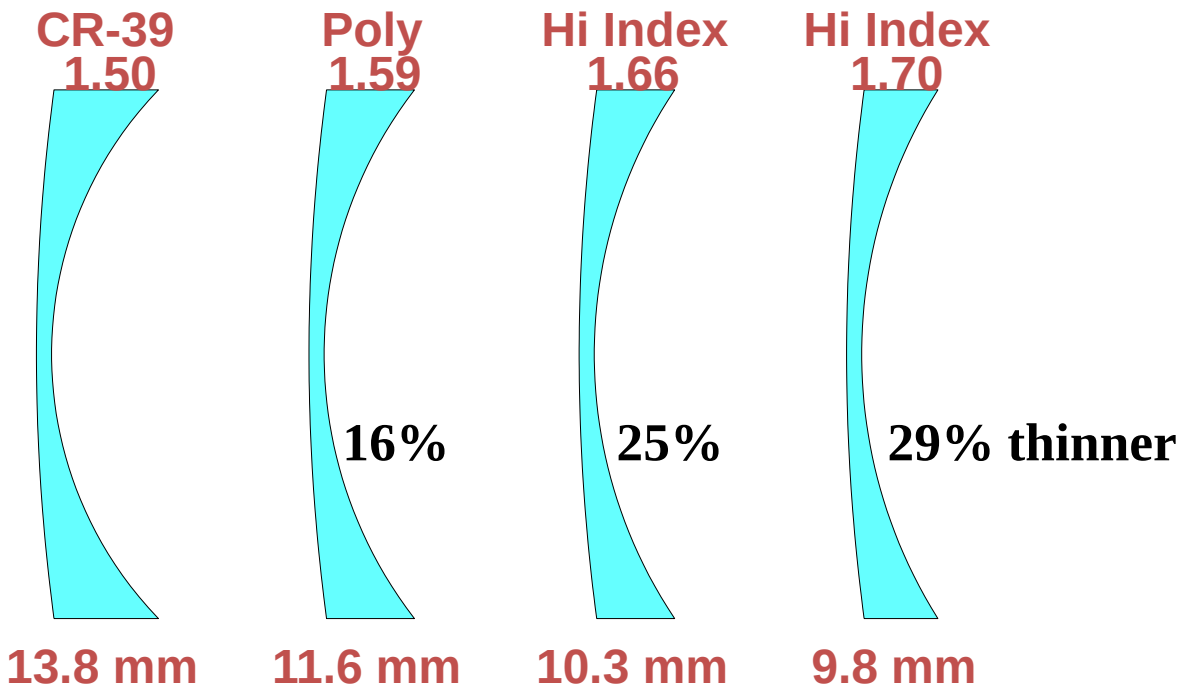
- High Index Resin
  - Thinner and lighter
  - Can be processed to 1.2mm ct
  - Available in most designs
  - Should be scratch and AR coated
  - For patient that wants best in category
  - 1.54, 1.55, 1.56, 1.57, 1.59, 1.60, 1.66, 1.70, 1.71
  - Cost **$$ - $$$$**

- Impact Resistant (Poly, Trivex, Phoenix)
  - Most impact resistant, protective in high index material
  - Thinner and lighter
  - Can be processed to 1.0mm ct
  - Low abbe, reduces clear field of view in higher Rx's
  - Duty to Warn
  - Cost **$**

- Glass
  - Traditional material
  - Stable and precise optics
  - Good acuity
  - Chemical or heat tempered for FDA compliance
  - Heavy
  - High index available: 1.60, 1.70
  - Cost **$ to $$**

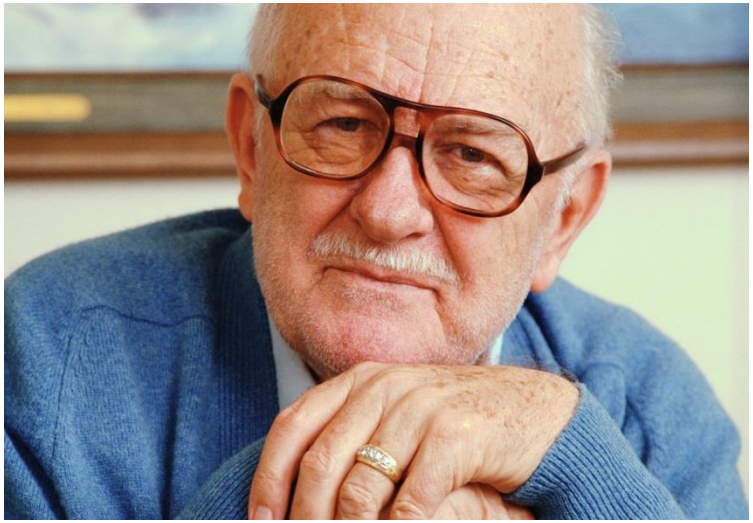
Thickness Comparisons

- -8.00 D



Advising About Materials

- Lens Type
  - lifestyle, Rx and history



Refractive Index

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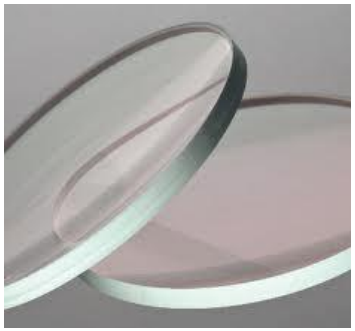
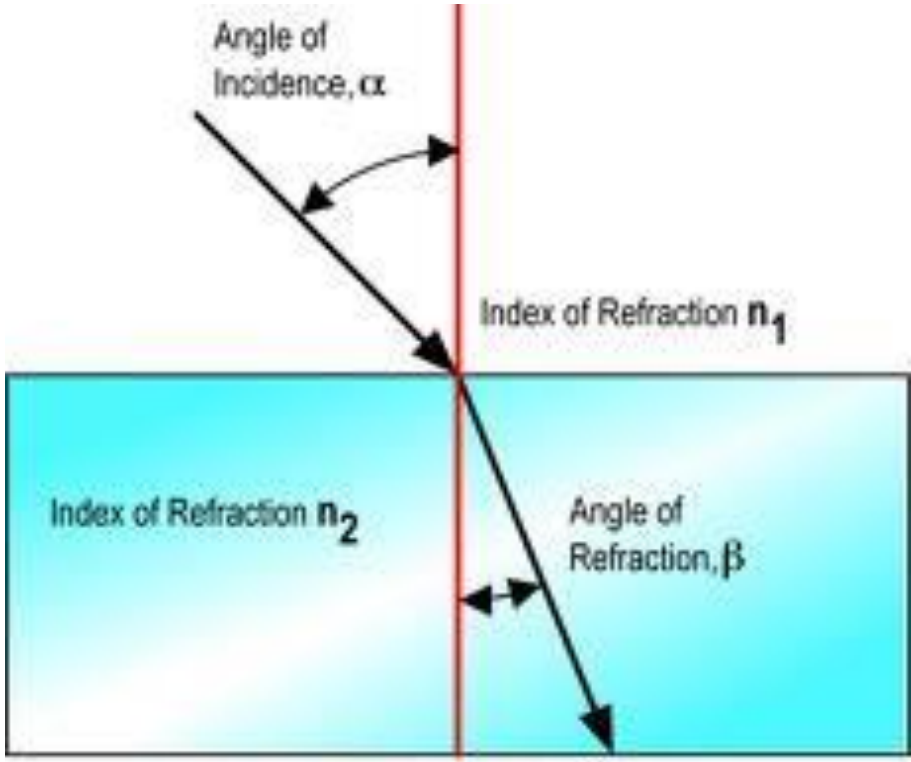
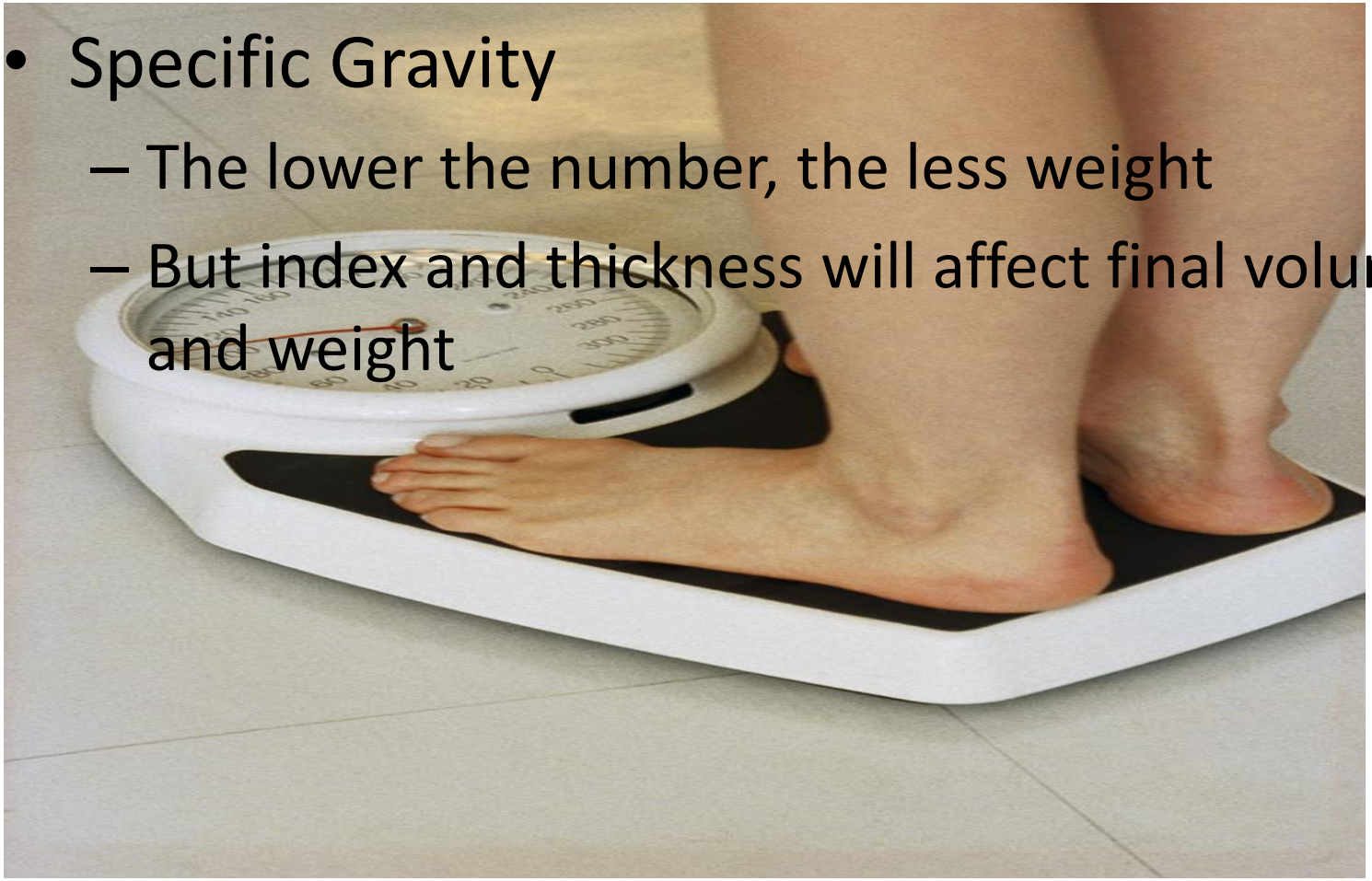
Refractive Index

- the higher the index, the thinner the lens
- but thickness and specific gravity will affect final volume and weight





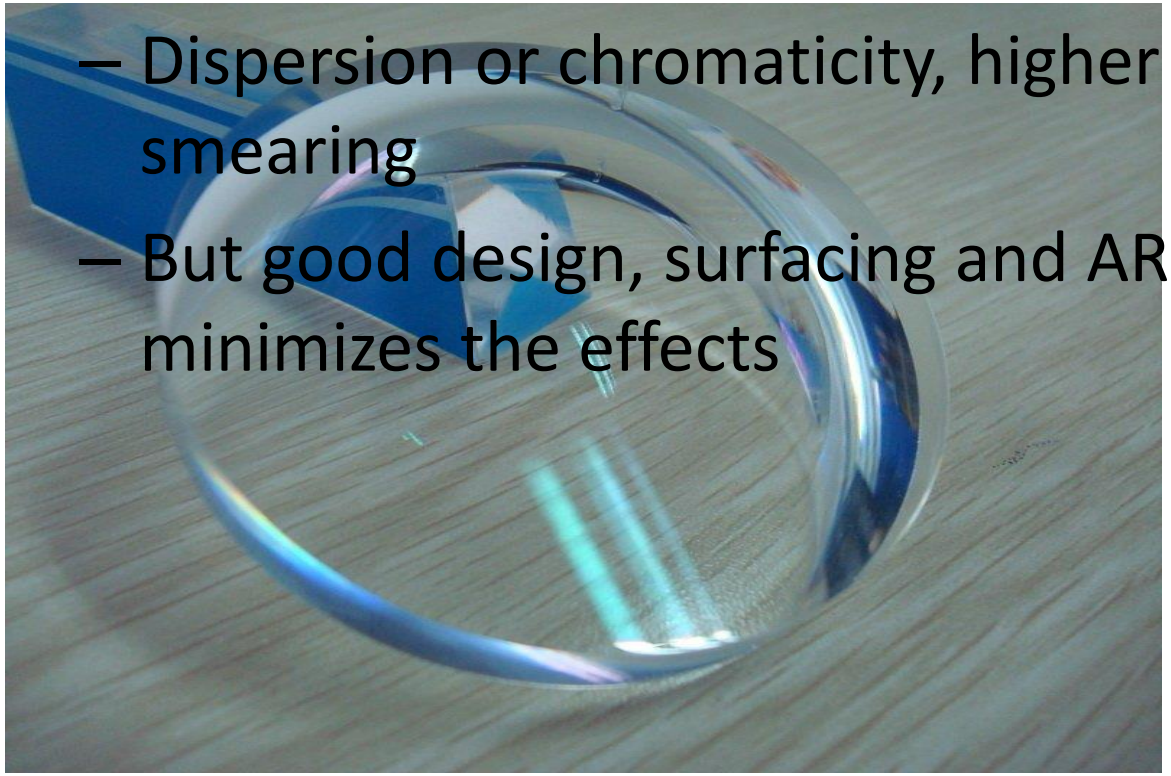
Specific Gravity

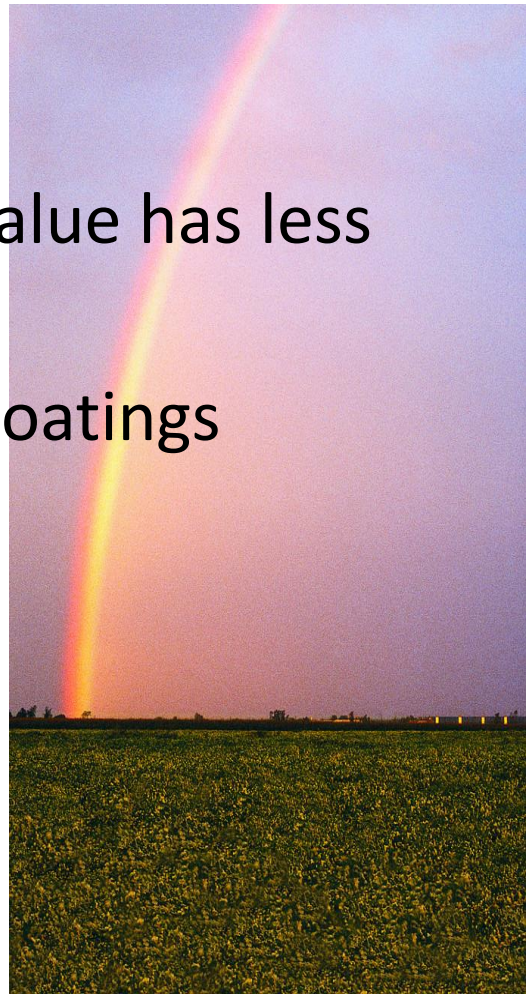


- Specific Gravity
  - The lower the number, the less weight
  - But index and thickness will affect final volume and weight

ABBE Value

- ABBE Number
  - Dispersion or chromaticity, higher value has less smearing
  - But good design, surfacing and AR coatings minimizes the effects





Material Comparison Chart

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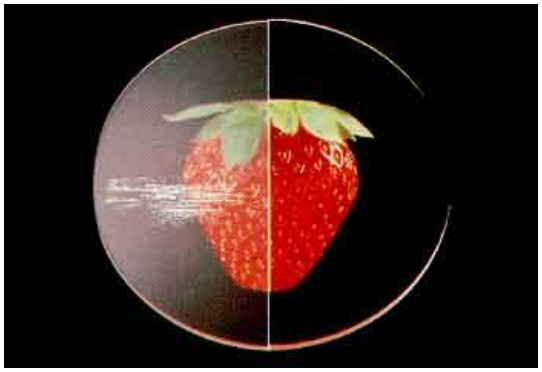
Lens Material	Refractive Index	Specific Gravity	Abbe Number
CR-39	1.499	1.32	58
Trivex (Trilogy, Phoenix)	1.530	1.11	45
HI 54	1.537	1.21	47
HI 55	1.550	1.28	38
HI 56	1.556	1.42	39
Polycarbonate	1.586	1.20	30
HI 60	1.592	1.30	42
HI 66/67	1.660/1.67	1.35	32
HI 70/71	1.700	1.41	36
Crown Glass	1.523	2.54	58
HI 60 Glass	1.601	2.62	40
HI 70 Glass	1.701	2.93	30
HI 80&90 Glass	Discontinued		

Treatments

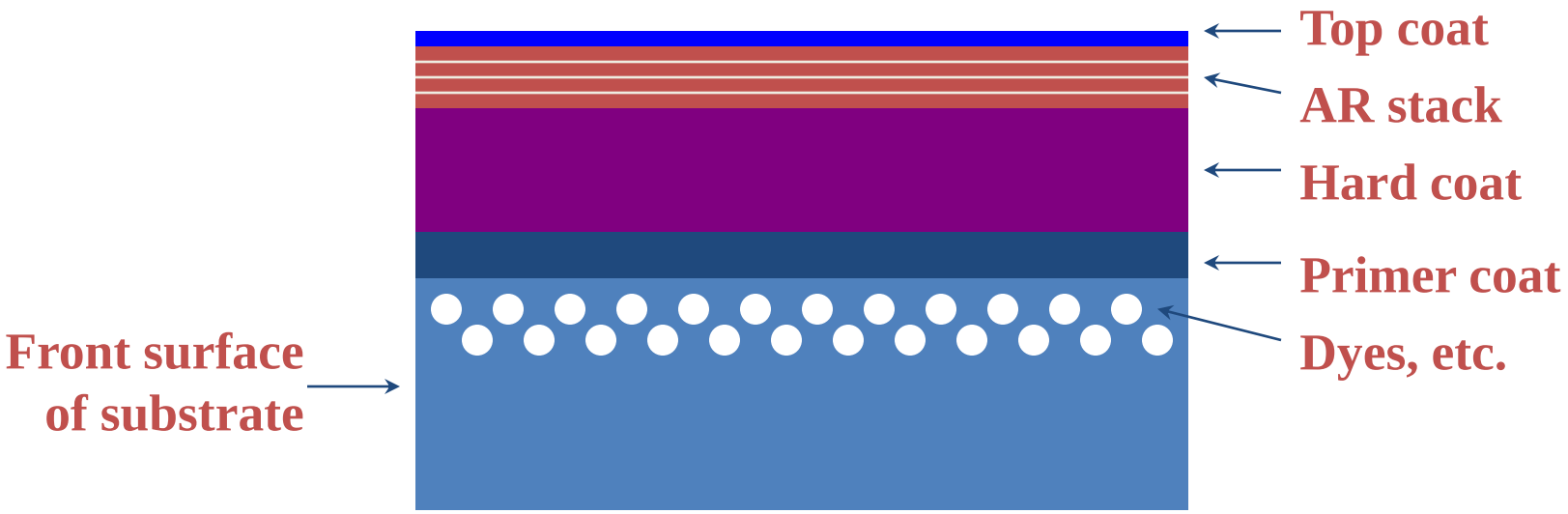
- Scratch resistant coatings extend the longevity of the lenses, improve the value of lenses
- Lenses with deep or fine scratches reduce the quality of vision through and scatter light



Scratched versus unscratched lens

Scratch Coatings

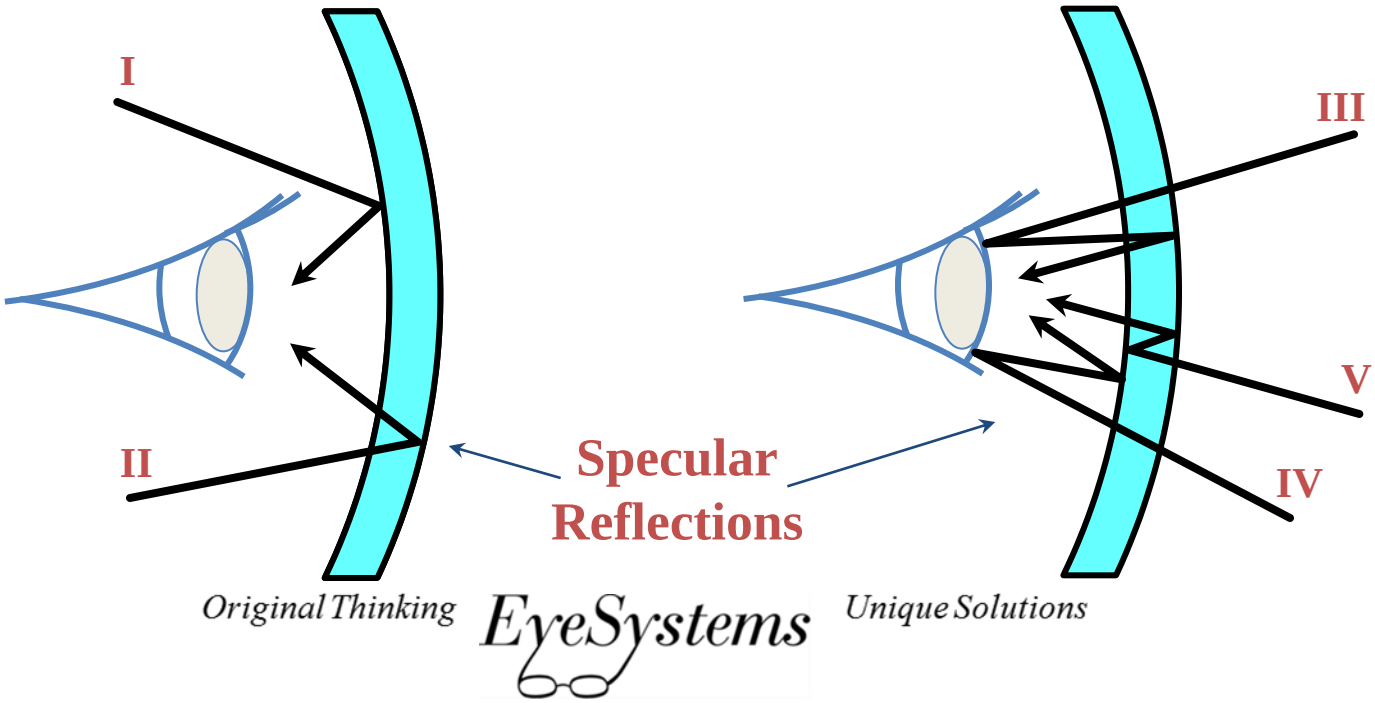
- Hard coatings are an integral part of a “system,” and are engineered for compatibility with additional treatments



A typical system of coatings

Surface Reflections

- A spectacle wearer can be bothered by 5 unique specular reflections, which are also affected by the surface curves of the lens



AR Benefits Wearers

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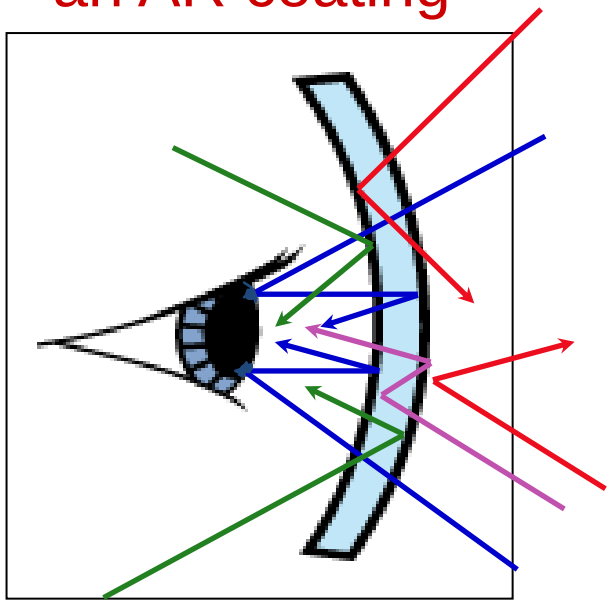
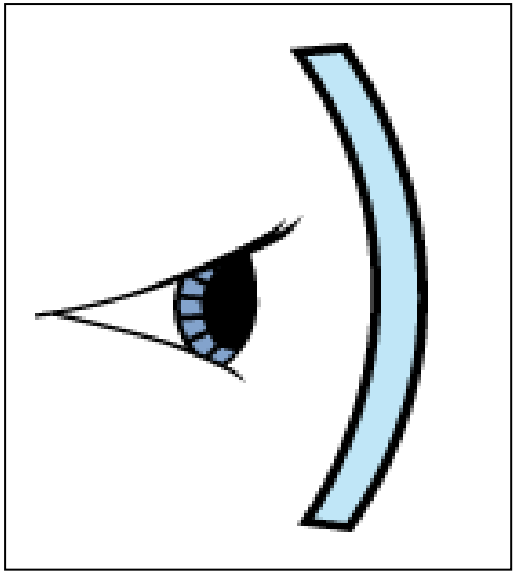
Wearers look better and see better

Visual noise without an AR coating



Visual noise with an AR coating



Tints

- Tinting plastic lenses:
  - Plastic lenses are immersed in organic dyes, which permeate into the surface of the lens substrate (not affected by thickness)

Tints

- Tinting glass lenses:
  - Glass lenses have metallic oxides added to the initial raw mixture, which are dispersed throughout the bulk of the lens

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Photochromism

LENSES ARE CLEAR WHEN INDOORS OR AT NIGHT AND AUTOMATICALLY DARKEN TO A SUNGLASS TINT WHEN EXPOSED TO SUNLIGHT.

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Temperature Dependence

Implementing Lens Choices

- Talk with your patient
- Take the time to make the right choice
- Educate your patient