



Barrier Technologies®

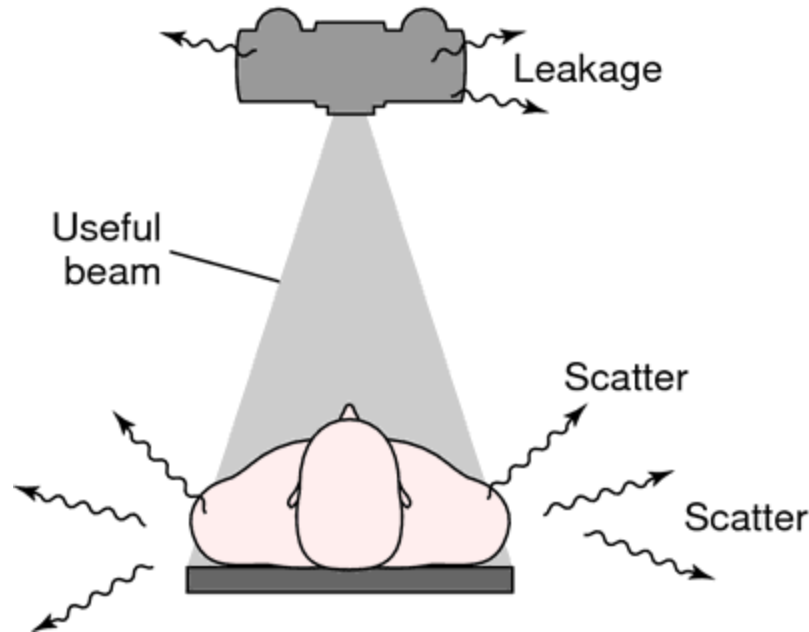
## Leaded Eyewear Training



CORNING  
Med-X® Glass



# Scatter Radiation



During procedures, radiation will bounce off of the patient. This scatter radiation is harmful to the human body, making proper protection essential. Since radiation does not leave our body over time, professionals must wear dosimeters that monitor their cumulative exposure to ensure they do not exceed recommended dosages.

# Who is at risk?

- Cardiac catheterization labs
- Fluoroscopy facilities
- Radiology facilities
- Radiopharmaceutical handlers
- Any profession with exposure to ionizing radiation



# Occupational Exposure Limits

**In 2013, the IAEA released a new exposure limit for our eyes**

The International Atomic Energy Agency recommends an eye **dosage limit of 20 mSv** a year. The previous yearly exposure limit was 150 mSv per year – *A nearly 8 fold reduction due to recent studies.*

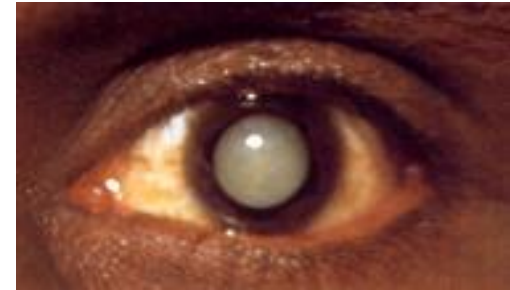
*“For occupational exposure in planned exposure situations the Commission now recommends an equivalent dose limit for the lens of the eye of 20 mSv in a year, averaged over defined periods of 5 years, with no single year exceeding 50 mSv.”*

(International Atomic Energy Agency)

# Radiation Induced Cataract



*Healthy Eye*



*Eye suffering from  
Radiation Induced Cataract*

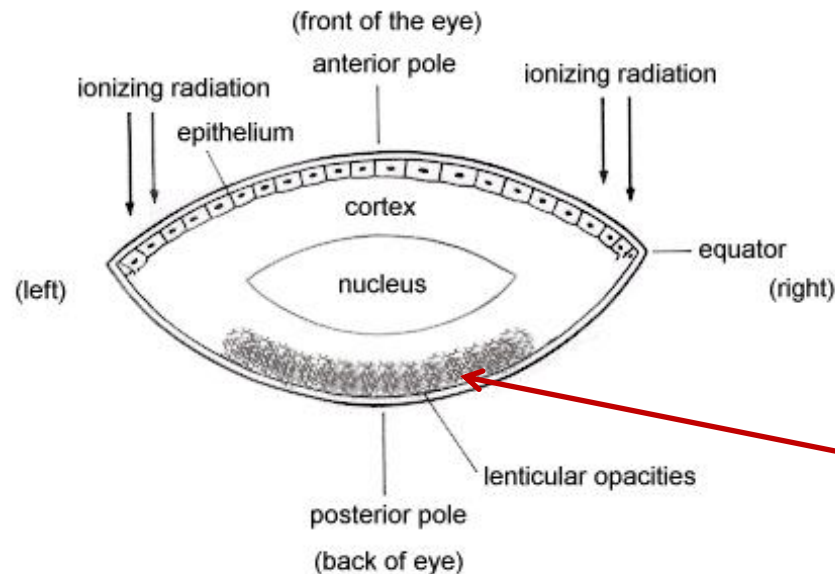
A cataract is a buildup of protein in the lens of the eye, making the lens opaque and resulting in blurred vision.

Wearing leaded eyewear is essential to preventing the onset of radiation induced cataract.

# Radiation Induced Cataract VS Age Related Cataracts

Radiation Induced Cataracts start at the anterior surface of the lens where dividing cells form a protein that migrates to the posterior subcapsular region. Radiation damage results in aberrant protein folding and dysregulation of lens morphology. Radiation induced opacities can be found in the lens cortex as well.

**Since these cataracts form in the back of the eye, closer to the optic nerve the vision impairing effects are more prominent. Symptoms manifest in decreased contrast sensitivity and eventual decreased acuity.**

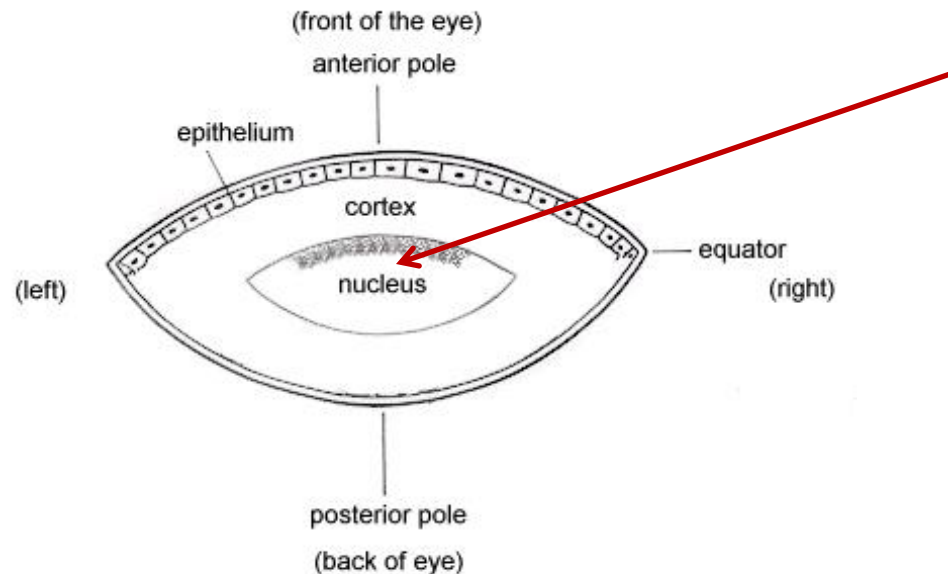


*Site of radiation induced cataract*

# Radiation Induced Cataract VS Age Related Cataracts

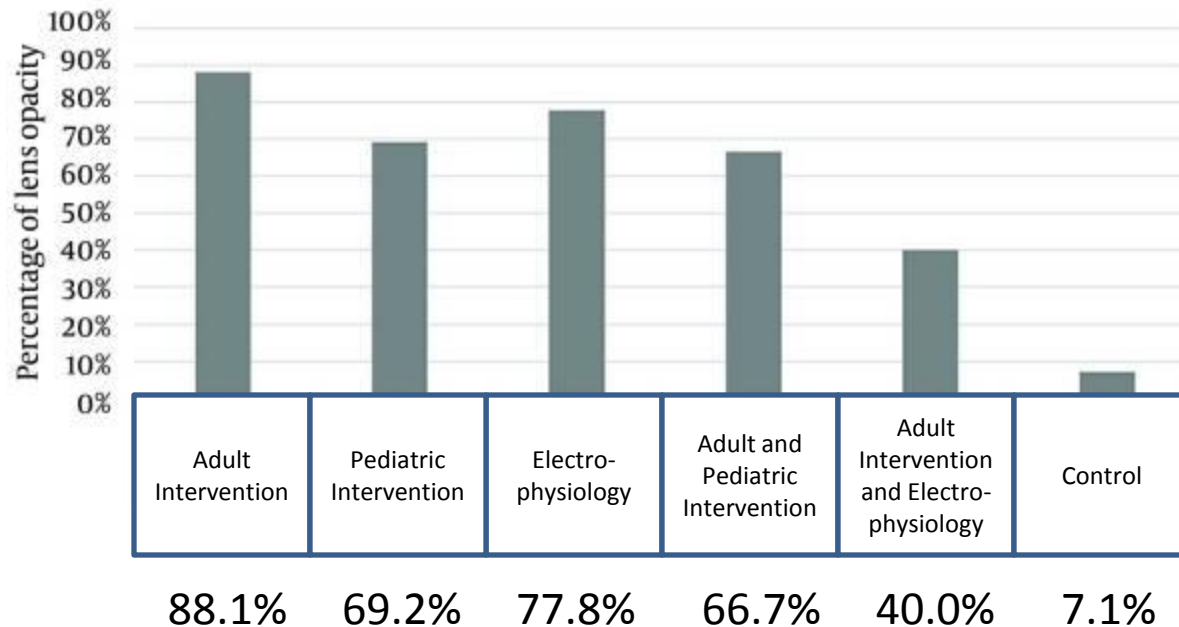
Age Related Cataracts are caused by gradual clouding, hardening and yellowing of the lens over a long period of time. Changes in the water content of the lens fibers create clefts that scatter light entering the eye.

These cataracts most frequently form in the nucleus and are the result of denatured proteins over a lifetime.



*Common site  
of age related  
cataracts*

# Radiation Induced Cataract



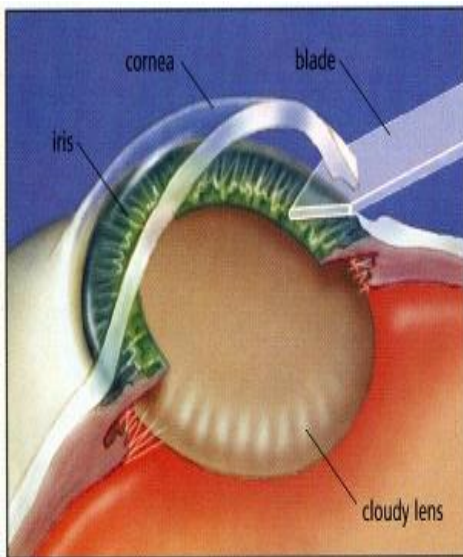
A study of 81 interventional cardiology staff members and their occurrence of lens opacity. The control group consisted of 14 nurses who did not work in the interventional site. The study concluded that increased doses resulted in a higher prevalence of cataract.



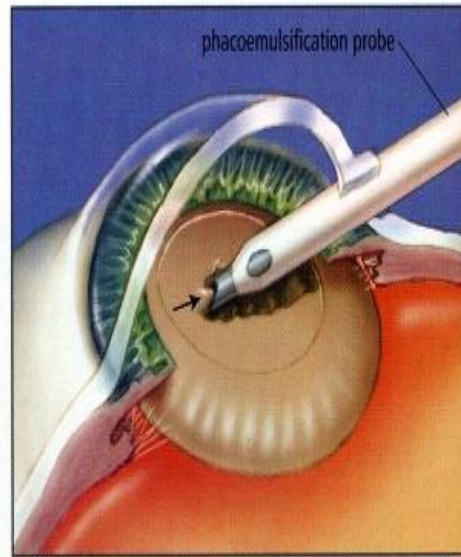
# Radiation Induced Cataract

If left untreated, cataracts will cause  
**BLINDNESS.**

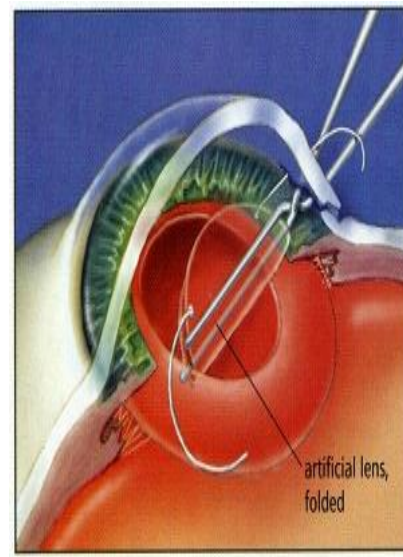
Surgery is the only treatment.



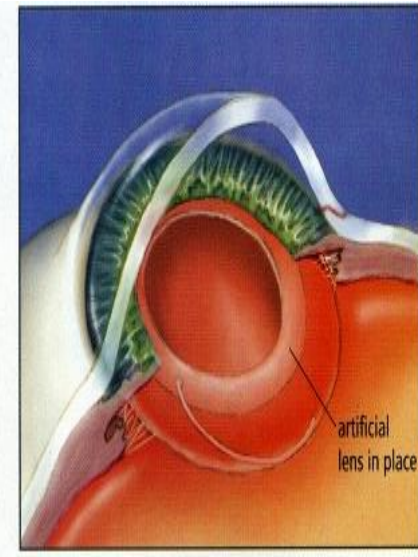
1. Incision: A small incision, approximately 3mm in width, is made at the corneal margin.



2. Emulsification: Phacoemulsification probe is inserted through corneal incision and ultrasound breaks cataract up into microscopic fragments, which can then be aspirated using the probe tip.



3. Intraocular Lens Implant: The artificial foldable intraocular lens is inserted and, once inside, the lens unfolds.



4. Result: The new lens is in place, the small incision heals naturally without the need for sutures, and vision is restored.

# Corning Med-X Glass Lenses

## Physical Properties

### Optical Properties

Refractive Index $n_d$	1.76
Transmission % @ 550nm through 5mm path	$\geq 85.0$

### Chemical Properties

Lead (Pb)	52%
Barium (Ba)	17%

### Mechanical Properties

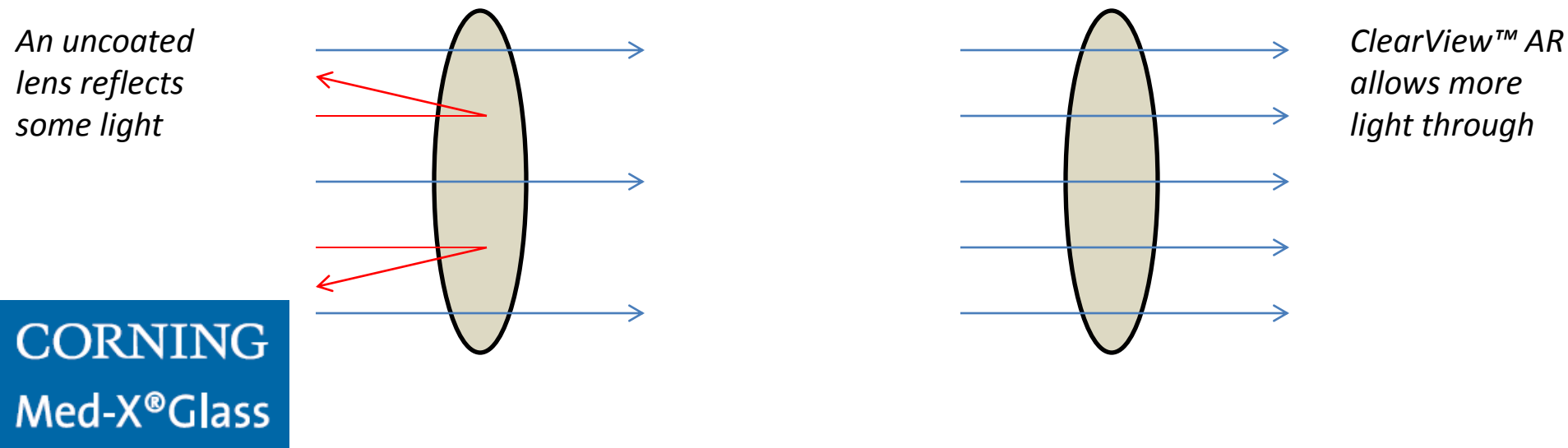
Density (g/cm <sup>3</sup> )	4.8
Knoop Hardness (kg/mm <sup>2</sup> )	409
Young's Modulus (GPa)	62.6
Poisson's Ratio	0.26
Coefficient of Thermal Expansion ( $\times 10^{-7}/^{\circ}\text{C}$ )	78.8

**Barrier Technologies has an exclusive partnership with Corning, allowing us to provide the best radiation protection with great clarity.**

Med-X Glass lenses have a .75mm lead equivalency, which means they have the same attenuating properties as a .75mm thick sheet of pure lead.

# Corning Med-X Glass Lenses

- Leaded glass lenses tend to reflect more light than a standard pair of glasses.
- ClearView™ Anti Reflective coating is recommended for optimal clarity and comfort.



# Corning Med-X Glass Lenses

- In a comparative study using two identical frames with identical prescriptions, Corning Med-X Glass was found to be **12% lighter and 34% thinner** than the leading competitor.
- Lighter Lenses improve comfort while thinner lenses improve optical clarity due to greater transmission of light.

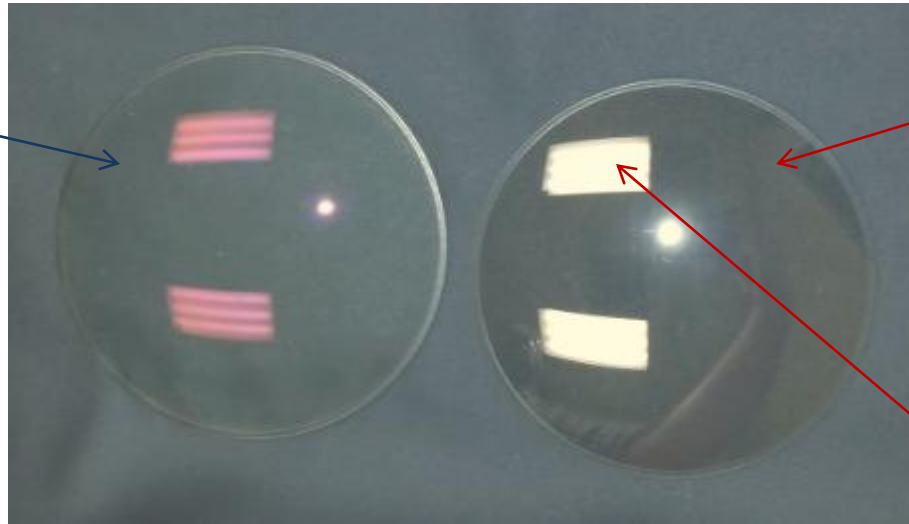
# ClearView™ Anti Reflective Coating



- Glare can be distracting, especially in medical environments where lighting is intense.
- ClearView™ coating allows more light to pass through the lens resulting in a clear image.
- The majority of eyewear sold for daily use has AR coating.

# ClearView™ Anti Reflective Coating

Med-X lens  
with AR  
coating



Med-X lens  
without AR  
coating

*Notice the increased  
reflections on the  
uncoated lens*

Additional features:

***Scratch resistant*** – hardens the lens surface

***Hydrophobic*** – repels moisture

***Oleophobic*** – repels oils

***Anti Static*** – repels dust



# Lens Styles

- Plano
- Single Vision
- Blended Bifocal
- Progressive



What does this all mean?

# Plano

- Lenses made without any prescription correction are considered “Plano”.
- Can be ordered in all available frames.
- Contact lens wearers can order plano glasses .
- (PL) in catalog.



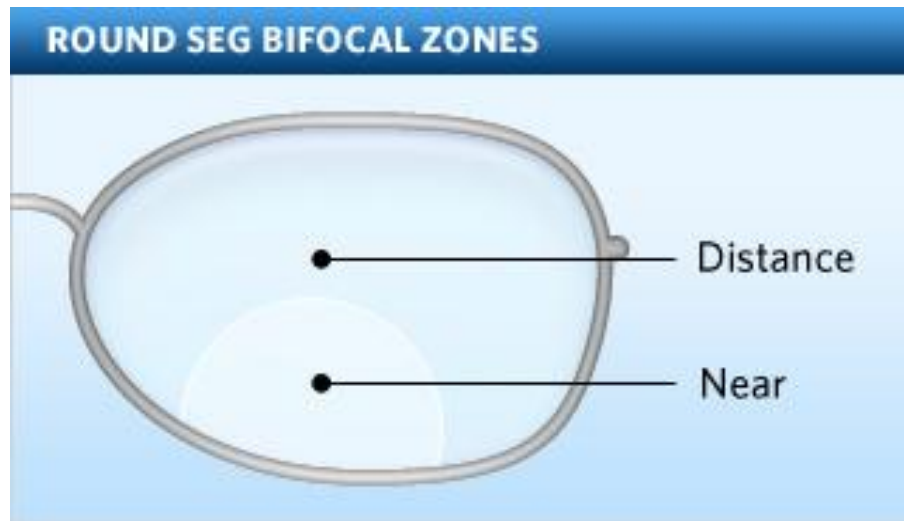


# Single Vision



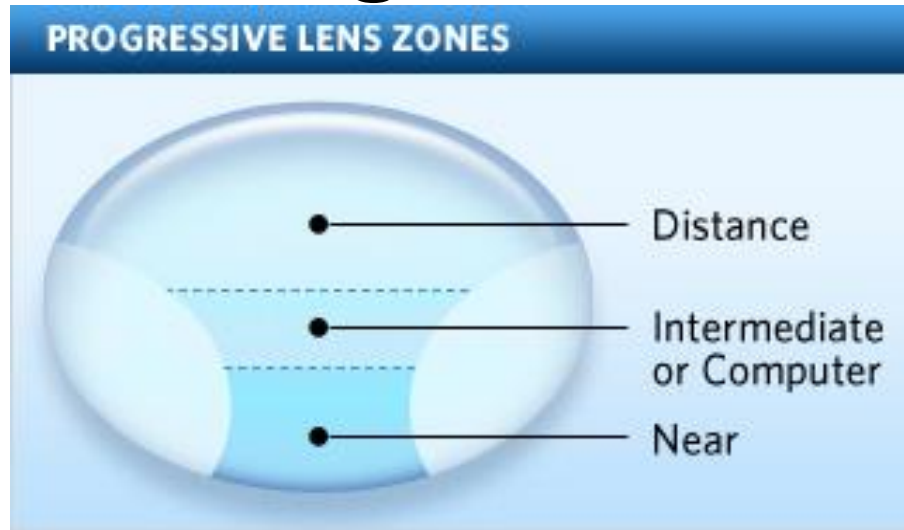
- **The entire lens corrects for either near or far, depending on the customer's prescription.**
- Corrects for myopia (near sightedness) or hyperopia (far sightedness).
- Can be done in many frame options.
- (SV) in catalog.

# Bifocal



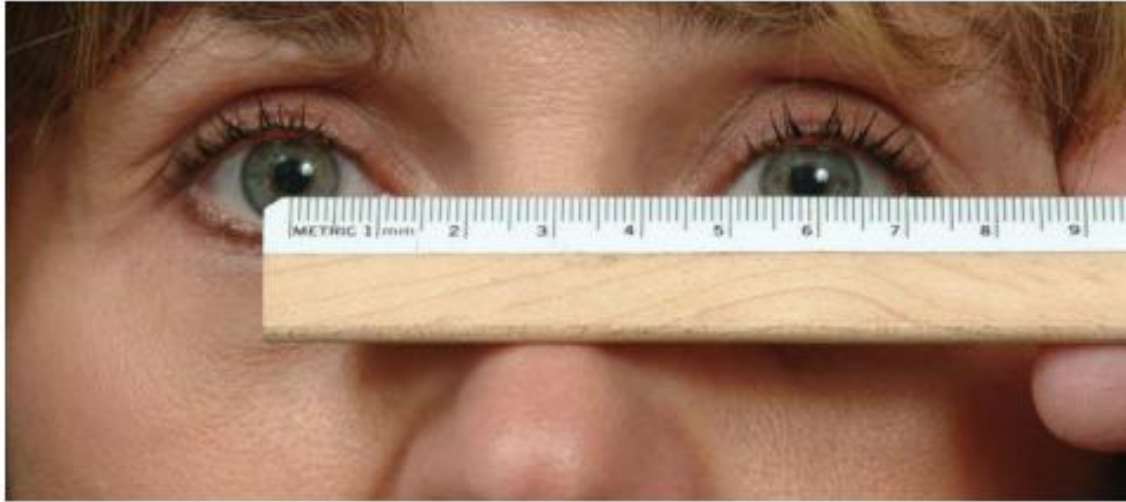
- **The top portion corrects for distance while the lower segment corrects for near.**
- Corrects for presbyopia (needing distance and near correction).
- Can be done in limited frame options.
- (BF) in catalog.

# Progressive



- **The top portion corrects for distance while the lower segment is a corridor where the power progressively strengthens, allowing the wearer to see mid range and near.**
- Corrects for presbyopia (needing distance and near correction).
- Can be done in limited frame options.
- (PG) in catalog.

# Interpupillary Distance (PD)



The proper PD measurement will allow the lenses to be centered correctly and allow for the wearer to see best.

If the customer already wears prescription eyewear, their PD will be on file with their optician.

# Why are there limitations on RX compatible frames?

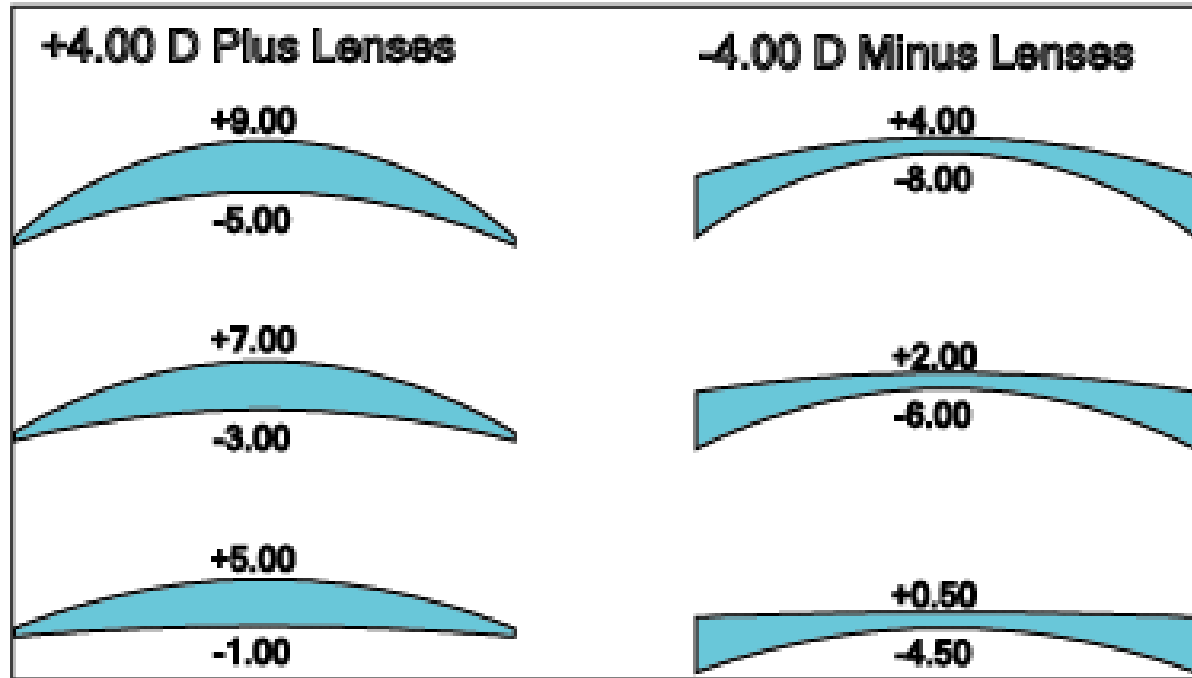


# Lens and Frame Geometry

- Lenses start with a base curve (the front surface).
- 8 Base is steep whereas a 6 base is flatter.
- Our manufacturing process uses a diamond tipped cutting blade to precisely create the necessary back curve.
- The combination of the front curve and back curve creates the actual power of the lens.



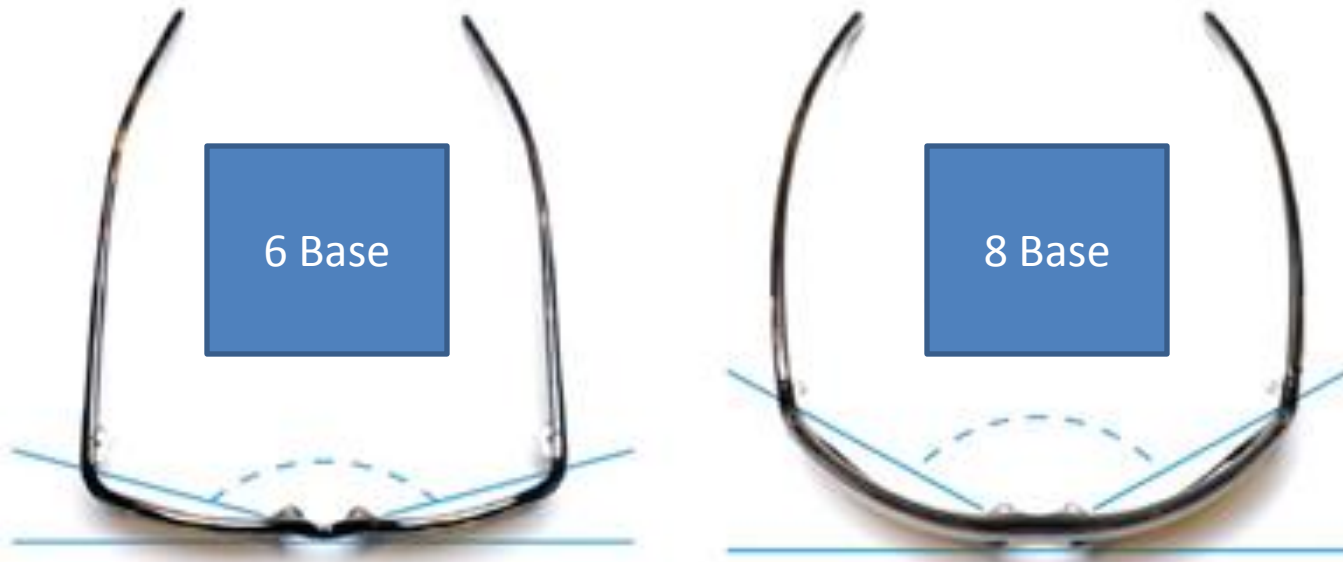
# Lens and Frame Geometry



There are many ways to create a prescription lens using different combinations of base curves and back curves. We use a 6 base lens to ensure that it will provide proper fitting into the variety of different frames we offer.

# Lens and Frame Geometry

You can see the difference in the shape of the frame between one designed for 6 base lenses and 8 base lenses. The 8 base lenses are more bowl shaped while the 6 base lenses are flatter. We can install prescription lenses in the 6 base frames and plano lenses in the 8 base frames.





# Lens and Frame Geometry

Frames are designed to be used with certain base curves. While it may be physically possible in certain cases for everyday dress eyewear, our use of leaded glass means that the final product must meet specific thickness standards to ensure safety. Some of the steeper frames will not allow prescriptions to safely be installed.



*Never a good idea to put a square peg in a round hole*

# Rx Compatible Frames

- Atomic\*
- Circuit
- T-Zone\*
- Grid II
- Barrier Lites
- MX-30\*
- ArmouRX
- Astro II
- 53 Wrap

- Nike
- Brazen
- Nike Siren
- Oakley Crosslink
- Oakley Two Face
- Sensor

*Sample 1*

Rx	SPH	CYL	AXIS	PRISM	ADD
O.D.	-1.50	-0.50	010		+2.25
O.S.	-1.25				+2.25

*Sample 2*

Rx	SPH	CYL	AXIS	PRISM	ADD
O.D.	- 150	- 50	X 010		+225
O.S.	- 125				+225

*Sample 3*

Rx		SPH	CYL	AXIS	PRISM
DISTANCE	O.D.	-1.50	-0.50	010	
	O.S.	-1.25			
NEAR	O.D.	+0.75	-0.50	010	
	O.S.	+1.00			

*Examples of eyeglass prescriptions*

*\* Atomic, T-Zone, and MX-30 suitable for high minus powers (-6.00 and up).*

# Non Rx Compatible Frames

- Oakley Gascan
- Oakley Fuel Cell
- Charger
- Saber
- Jolt
- Velocity
- Blade
- Viper
- Fitover
- Wraptor
- Slim-T
- Nike Rabid
- Nike Premier
- Contender
- Voltage



# Proper Care

- Eyewear should always be kept in the case when not in use.
- The included soft pouch can also be used as a cleaning cloth.



# Proper Care

- To clean the lenses, use any optical lens cleaner approved for use with eyeglasses.
- Always wet the lenses before cleaning to reduce the likelihood of solid particles scratching the lens like dust and dirt.
- In case of heavily soiled lenses, mild non-abrasive dish detergent diluted with water will work well. Rinse clean with warm running water and dry with a clean cotton or microfiber cloth.

# Thank you!

Barrier Technologies would like to thank you for viewing this tutorial. Any questions may be sent to:

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