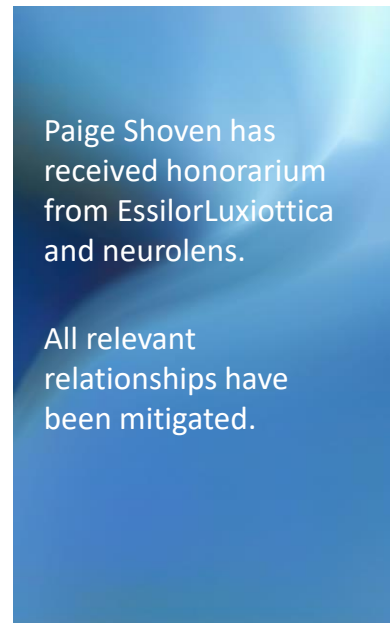


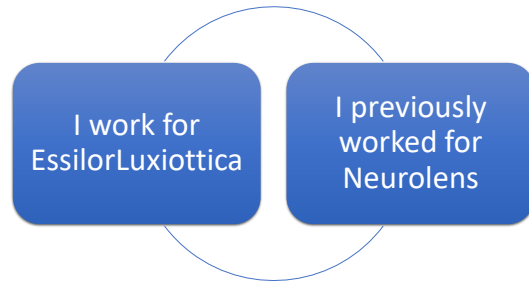


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Disclaimers



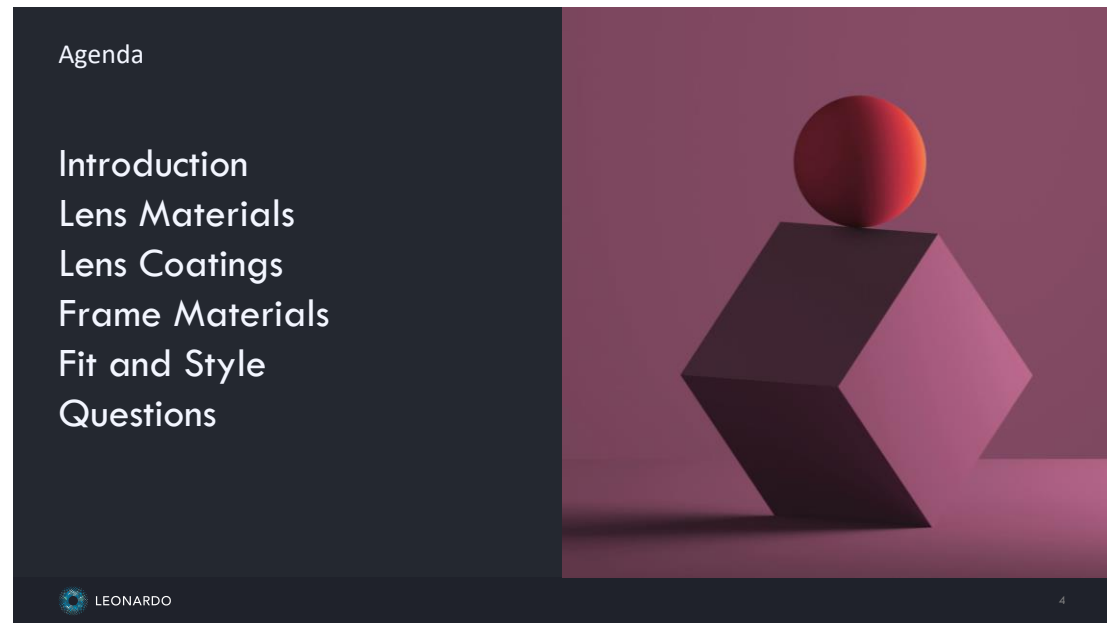
On behalf of Vision Expo, we sincerely thank you for being with us this year.

Vision Expo Has Gone Green!

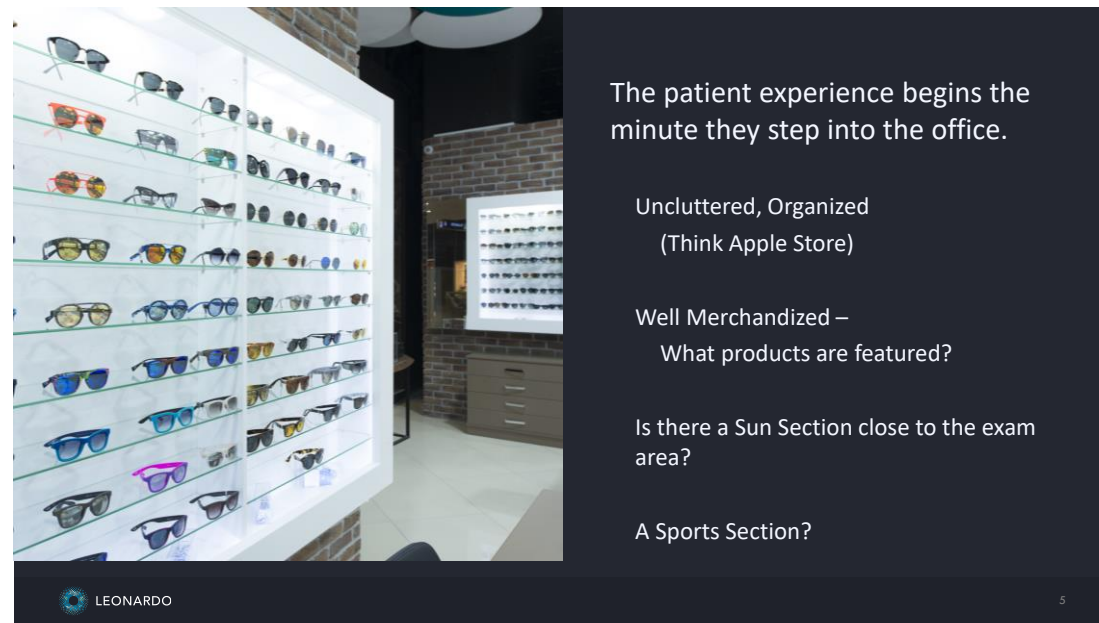
We have eliminated all paper session evaluation forms. Please be sure to complete your electronic session evaluations online when you login to request your CE Letter for each course you attended! Your feedback is important to us as our Education Planning Committee considers content and speakers for future meetings to provide you with the best education possible.



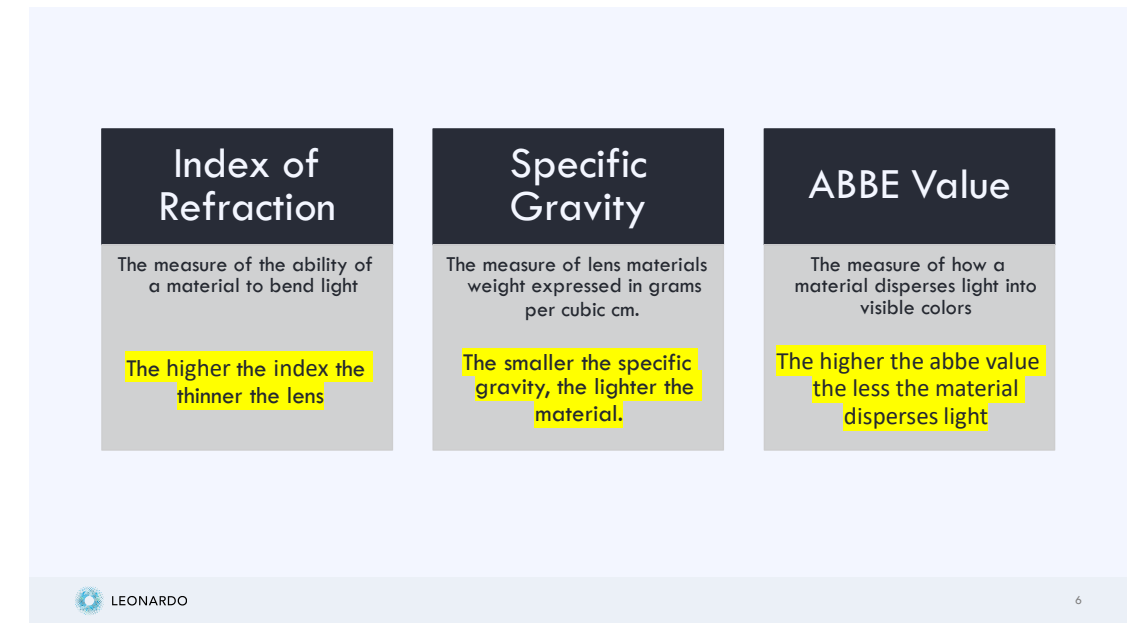
3



4



5



6

Can we get all three at the same time?

| Material | Refraction Index | Specific Gravity | Abbe Value |
|-----------------------|------------------|------------------|------------|
| CR-39 | 1.49 | 1.32 | 58 |
| Crown Glass | 1.52 | 2.54 | 60 |
| Trivex | 1.53 | 1.11 | 43 |
| Mid-Index | 1.56 | 1.42 | 39 |
| Polycarbonate | 1.59 | 1.20 | 32 |
| High-Index Plastic | 1.60 | 1.34 | 37 |
| Highest-Index Plastic | 1.66 | 1.35 | 32 |
| High-Index Glass | 1.70 | 2.99 | 32 |
| Highest-Index Glass | 1.80 | 3.37 | 25 |

- High Index of Refraction
- Low Specific Gravity
- High ABBE Value

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7

Crown Glass

| Positives | Negatives | When to Recommend |
|---------------------------------|-------------------------------------|------------------------|
| Offers the Best Optical Clarity | Heavy Material Prone to Breaking | Some safety situations |

Crown Glass was the first material used to make eyeglasses (and contact lenses, but that is for another day)

LEONARDO

8

Standard Plastic 1.50

| Positives | Negatives | When to Recommend |
|---|---|--------------------------------------|
| Can be coated with scratch Resistance and UV protection Lighter and more impact resistant than glass Low-cost alternative | Thicker and heavier than newer materials Is not impact resistant | When patients need a low-cost option |

- Easy to remember, 1.50 was introduced in the 1950s
- For decades, it was the material of choice
- First alternative to glass lenses

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9

Trivex 1.53

| Positives | Negatives | When to Recommend |
|---|---|---|
| High Tinsel Strength Good choice for Drilled Rimless Frames Resistant to cracking and breaking Scratch Coat and UV Protection built in | Thicker some other option Looses tinsel strength when AR applied | Patients needing thinner lenses but struggle with polycarbonate Drilled Frames |

Trivex was originally developed for visors on army helmets

Trivex is a thinner and lighter option than standard plastic 1.50

LEONARDO

10

10

Polycarbonate 1.59

| Positives | Negatives | When to Recommend |
|---|--|---|
| 30% Thinner and Lighter than CR-39 Lenses 100% UVA and UVB Protection on the front of the lens 12 times more impact resistant than CR-39 Plastic Lenses | 1.67 Thinner for RXs above +/- 4.00 Patients with RXs above +/- 5.00 may experience color aberrations in the lenses | Active patients in need of impact resistance Patients looking for light comfortable lenses Children and Teens Safety Eyewear |

• Polycarbonate is the most impact-resistant material and is a great option for children's eyewear.

• Originally developed by NASA for astronaut face shields

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11

11

Hi Index 1.60

| Positives | Negatives | When to Recommend |
|---|---|--|
| 30% Thinner than CR-39 Plastic Lenses Good Optical Quality | More Expensive than other materials Specific Gravity is greater than CR-39 Plastic | Alternative to Polycarbonate Drill Mount lenses |

High Index 1.60 is thinner but heavier than CR-39 Plastic

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12

12

High Index 1.67

Positives

Good balance of Index of Refraction and Specific Gravity

Great choice for patients above +/- 4.00

Negatives

More expensive than other lens choices

When to Recommend

Patients with higher powered prescription no matter the frame they choose

High Index 1.67 offers the best compromise of Index of Refraction, ABBE, and Specific Gravity

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13

High Index 1.74

Positives

Thinnest material readily available

Negatives

Better options for drilled frames

More expensive than other options

When to Recommend

Patients with RXs above +/- 6.00


Patients needing a thin, flat lens

• High Index Lens Materials Reduce Lens Thickness making the lenses more comfortable and better looking.

LEONARDO14

14

Types of Lenses

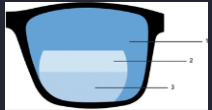


Single Vision
Bifocal
Progressive

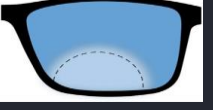
LEONARDO15

15

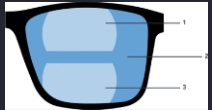
Other Occupational Lenses



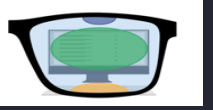
Trifocal
Distance
Intermediate
Near




Blended Bifocal
Distance
Near



Double D
Intermediate
Distance
Near



Computer
Distance
Intermediate
Near



E-D Trifocal
Distance
Intermediate
Near

LEONARDO16

16



Scratch Resistance Coating

LEONARDO17

17



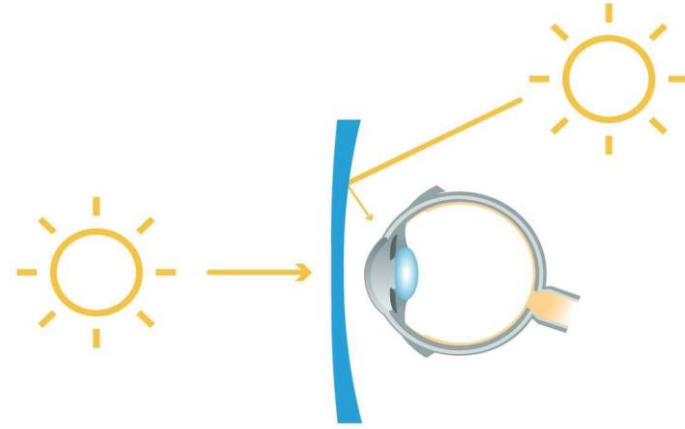
Anti Reflective Coating

Reduces Glare allowing more light in
8-14% Light Reflected without AR
Reflection Reduced to .5% with AR

LEONARDO18

18

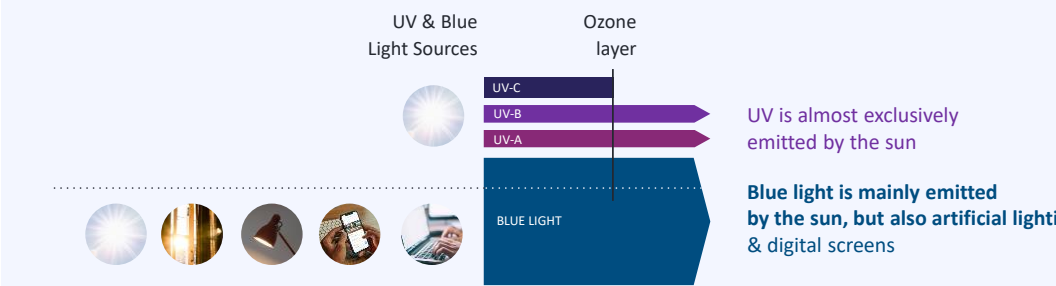
UV Solutions



- All plastic lenses, with the exception of 1.50 lenses absorb UVA and UVB from the front of the lenses.
- Glass and plastic 1.50 lenses offer some protection from UVB but not for UVA.
- However, lenses do not protect from UVA or UVB reflecting off the back of the surface into the eye.

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UV AND BLUE LIGHT SOURCES



UV is almost exclusively emitted by the sun


Blue light is mainly emitted by the sun, but also artificial lighting & digital screens

BLUE LIGHT FROM THE SUN PASSES THROUGH WINDOWS AND CONTRIBUTES TO BLUE LIGHT EXPOSURE INDOORS (X60 VISIBLE LIGHT VS SOMEONE IN AN ARTIFICIAL LIGHTING ROOM WITHOUT ANY WINDOWS)

LEONARDO

Photochromatic Lenses

A photochromic lens darkens when exposed to radiation, most commonly ultraviolet (UV) radiation. The darkening of the lenses is called photochromism, which is a process involving a reversible chemical reaction where a colorless molecule is converted to a colored form by the application of energy.



The transmission through photochromic lenses varies according to the intensity of light. They are clear indoors, and dark outdoors.

Photochromic lenses are activated by exposure to UV and a small amount of visible light.

They protect from UV rays and filter blue-violet light


They are available in many colors and provide full UV protection

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Tinted Lenses

DEPENDING ON THE TINT

A segment of Visible light is transmitted through the lens, while the other is filtered/absorbed. The percentage and nature of light reaching the eye is dependent on the intensity and color of the lens.




USEFUL TIPS

Lens tints are very important. Not only do they increase visual comfort, but they also offer better contrast in some situations. Advise your customer on the tint that best suits their environment and

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Polarized Lenses




Brightness Reduction UV Protection Does not Fade No Glare* Clarity of* Vision True Color* Perception

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What can you combine?

- One Lens Material
- One Frame
- One Lens Style (generally speaking)
- One Scratch Coat
- One UV Protection
- One AR Coat
- Multiple Blue Light Protection
- One Color Option (generally speaking)

1 Great pair of Glasses



LEONARDO

❖ Optyl

An epoxy resin manufactured through vacuum casting. It's approximately 30% lighter than the traditional acetate material providing wearing comfort as one of its major benefits.

ADVANTAGES:

- Hypo-allergenic and retains its luster due to not having plasticizers
- Extremely light weight
- Excellent shape and adjustment retention and is not affected by normal swings in weather temperature
- Extremely heat resistant—it withstands temperatures + 350 °C
- A protective coating delivers good resistance to surface scratching.
- Allows for many fashion shapes and full range of colors
- Good resistance to most chemicals and solvents.

DISADVANTAGES:

- Adjustments are difficult due to having shape memory. Any adjustments have to be held until cool.
- Needs a lot of heat to stretch, underheating may result in frame breakage. Will not shrink.

❖ Kevlar

Like polycarbonate it is great for safety and sport frames. Like nylon, the color range is limited to darker shades, the most common being an amber tone. As with polycarbonate and nylon, its flexibility and strength make for difficult adjustments. Sizing of lenses must be precise since Kevlar resists expansion and shrinkage.

ADVANTAGES:

- Impact protection and breakage resistant
- Remains unaffected by temperature swings

DISADVANTAGES:

- Adjustments are difficult to achieve and maintain therefore fit must be verified from the beginning
- Color and style limitations

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Overview of Metal Frame Materials

ADVANTAGES:

- Allow form changes through pressure and torque
- Different metals can be strategically combined for functional and aesthetically pleasing frames

DISADVANTAGES:

- Could be allergenic, depending on the metal (nickel, copper, chrome, aluminum)
- Could be relatively heavy, depending on the metal



32

❖ Aluminum: Strength and Lightness

It is generally strong and relatively lightweight for its mass, but because of its stiffness, it is somewhat difficult to adjust and difficult to achieve good lens fits without some gapping. It is used on a limited basis today as it has been surpassed by many more modern materials.

ADVANTAGES:

- Light weight
- Low density allows for a thick look without the weight
- Good resistance to corrosion
- Can achieve a high luster in its natural color

DISADVANTAGES:

- Poor durability of colored finishes
- Unable to be soldered so nose pads, hinges, and endpieces have to be fastened with rivets causing problems in the long-term
- Limited adjustments due to its stiffness

❖ Beryllium: A Lightweight and Flexible Alloy

Often combined with copper to form a lightweight and flexible alloy known as copper beryllium.

ADVANTAGES:

- Strong
- Flexible
- Lightweight
- Endurance to fatigue

DISADVANTAGES:

- Not used alone due to cost

33

❖ Monel: The most common alloy used for frames

Monel, an alloy made of copper, zinc, iron, and manganese. Due to its tensile strength and stability, it is commonly used in endpieces and bridges. However, its relative rigidity can make adjustments challenging.

ADVANTAGES:

- Good tensile strength and stability, holds adjustments well
- Cost effective
- Good adaptation to lens curves

DISADVANTAGES:

- Medium corrosion resistance
- Adjustments are difficult

❖ Nickel and Nickel Silver: Flexible and Strong

Nickel is malleable and resistant to corrosion, making it suitable for nose pad arms and other adjustable parts. Nickel silver, another alloy, offers rigidity and is used for hinges, bridges, and endpieces. However, its brittleness and tendency to tarnish should be considered.

ADVANTAGES:

- Malleable and corrosion-resistant
- Resistance to stress

DISADVANTAGES:

- Nickel silver can be brittle and prone to tarnishing
- Expensive

34

❖ Phosphorous Bronze:

Another alloy often used in the manufacturing of frames and parts. It is a mixture containing a substantial amount of copper. Its often used for thin temple applications

ADVANTAGES:

- Flexible
- Holds a very high luster

DISADVANTAGES:

- Adjustments are difficult and don't tend to hold
- May be prone to tarnish and corrosion

❖ Stainless Steel: Flexibility and Corrosion Resistance

An alloy of mostly iron with some chromium, manganese, and nickel.

ADVANTAGES:

- Excellent corrosion resistance
- High strength and flexibility, suitable for stable and thin construction
- Does not react with the skin

DISADVANTAGES:

- Adjustments can be difficult and often do not hold

35

❖ Titanium: High-Quality, Lightweight, and Durable


Titanium is a newer, high-tech metal that has become synonymous with high quality, durable, lightweight frames

ADVANTAGES:

- 40% lighter than traditional metals
- Will not corrode
- Strong and durable

DISADVANTAGES:

- High cost due to specialized fabrication



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Click to edit Master title style

| Plastic | Metal | Nylon | Special Materials |
|--|-------|-------|-------------------|
| Do: Always ensure proper temple fit using heat | | | |
| Don't: Attempt to adjust the bridge | | | |
| Tools to use: Frame warmer | | | |

Click to edit Master title style

| Plastic | Metal | Nylon | Special Materials |
|--|--|-------|-------------------|
| Do: Always ensure proper temple fit using heat | Do: Adjust nose pads and temples with proper tools | | |
| Don't: Attempt to adjust the bridge | Don't: Use heat to adjust | | |
| Tools to use: Frame warmer | Tools to use: Different pliers | | |

Click to edit Master title style

| Plastic | Metal | Nylon | Special Materials |
|--|--|--|-------------------|
| Do: Always ensure proper temple fit using heat | Do: Adjust nose pads and temples with proper tools | Do: Ensure proper fit as is | |
| Don't: Attempt to adjust the bridge | Don't: Use heat to adjust | Don't: Use heat to adjust | |
| Tools to use: Frame warmer | Tools to use: Different pliers | Tools to use: Angling pliers | |

Click to edit Master title style

| Plastic | Metal | Nylon | Special Materials |
|--|--|--|---|
| Do: Always ensure proper temple fit using heat | Do: Adjust nose pads and temples with proper tools | Do: Ensure proper fit as is | Do: Learn how to work with the material |
| Don't: Attempt to adjust the bridge | Don't: Use heat to adjust | Don't: Use heat to adjust | Don't: Forget to teach your customer how to care for the specific materials |
| Tools to use: Frame warmer | Tools to use: Different pliers | Tools to use: Angling pliers | Tools to use: Specific to materials |

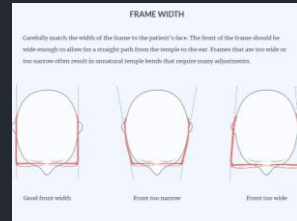


The type and style of lenses must be edged correctly to be mounted.

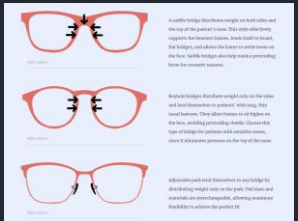
Thickness may need to be added or subtracted to allow special edge coatings

| | |
|--------------------------------|--|
| Drilled Rimless | + Must be ground thicker to add stability around the drill hole - Accentuates thickness since entire lens is in front of the mounting |
| Grooved Rimless | + Must be ground thicker to allow for thickness of the groove - Minimizes thickness by placing the lens to the back of the mounting |
| Plastic Full Rim | + Cushions and protects to allow edges to be ground to minimum thickness - Hides Thickness by partially concealing edges |
| Metal Full Rim | + Must be ground slightly thicker to prevent warping and chipping - Accentuates thickness by showing most of the lens edge |
| Roll and Polished Edges | + Impractical on thin edges - Removes thickness already there |

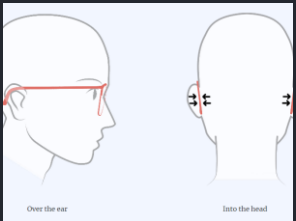
Frame Style First- Don't be afraid to say no



Width



Bridge

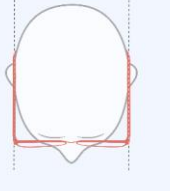
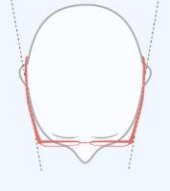
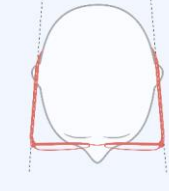


Temples

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FRAME WIDTH

Carefully match the width of the frame to the patient's face. The front of the frame should be wide enough to allow for a straight path from the temple to the ear. Frames that are too wide or too narrow often result in unnatural temple bends that require many adjustments.

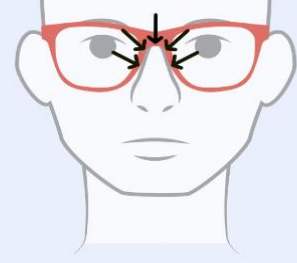
Good front width Front too narrow Front too wide

Start with frames that are relatively close to fitting straight from the factory.

Your inventory should represent frames that come in many sizes to fit your different patient's needs.


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The bridge fit that distributes the weight of the glasses over a larger area of the nasal surface, creates less pressure and conveys more comfort.



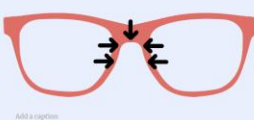
Good fit with even weight distribution

The bridge fit that rest the weight of the glasses on a lesser area of the nasal surface create concentrated pressure, which often leads to pain and irritation.




Poor fit with all the weight on only two points


LEONARDO 45



A saddle bridge distributes weight on both sides and the top of the patient's nose. This style effectively supports the heaviest frames, lends itself to round, flat bridges, and allows the frame to settle lower on the face. Saddle bridges also help mask a protruding nose for cosmetic reasons.



Keyhole bridges distribute weight only on the sides and lend themselves to patients' with long, thin nasal features. They allow frames to sit higher on the face, avoiding protruding cheeks. Choose this type of bridge for patients with sensitive noses, since it eliminates pressure on the top of the nose.

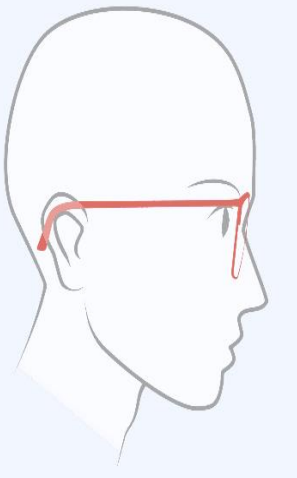


Adjustable pads lend themselves to any bridge by distributing weight only on the pads. Pad sizes and materials are interchangeable, allowing maximum flexibility to achieve the perfect fit.

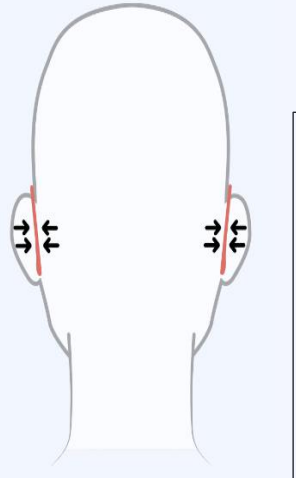
Bridges on glasses are made differently to fit the needs of different populations.

Ensure the office is considering patient demographics when choosing frames that offer different bridge types and sizes.

LEONARDO 46



Over the ear



Into the head

The temple section of a frame should rest comfortably over the back of the ear and on the side of the head.

Discomfort occurs when the temple holding power is concentrated over a limited area.

Like a good bridge fit, a well-adjusted temple disperses the maximum amount of temple surface over the greatest temporal area.

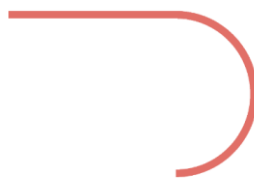
LEONARDO 47

Five temple styles are available

Comfort cables and Riding Bows are less common today, but you might get asked about them


COMFORT CABLES

The cable design is fashioned from thin braided metal strands. The style is lightweight and flexible, and comfortably pulls lenses toward face. It fits close to the ear.




RIDING BOWS


Riding bow tips are built with plastic. They fit close like cables but with less flexibility. They strongly pull the frame toward the face. They are often used for sport, children, or safety frames.




LEONARDO 48



SKULLS



CONVERTIBLES




LIBRARIES

This style is tapered to facilitate an over-the-ear bend.

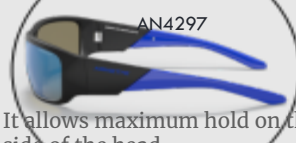
A lower paddle offers strong holding power on the side of the head.

It is made of plastic or metal.

This style is thin and lightweight. It can be fitted straight back or like a skull temple.



The style is thick and massive and fits straight-backed.



AN4297

It allows maximum hold on the side of the head.

It is easy to slip on and off.

LEONARDO

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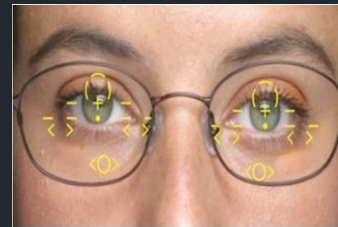
Fitting Heights should be taken with the patient in their normal posture

1. Place the patient facing you squarely across the fitting table
2. Position your chair so that you are at the same height as the patient
3. Have the patient drop their arms loosely to their sides.
4. Assure that you are perfectly level with the patient
5. Instruct them to look at you between your eyes (or use the "open eye" method)
6. Remember "muscle memory"
7. If needed, direct the patient's movement to correct for near vision posture
8. Mark the center of the pupil on each demo lens

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Measure Monocular Heights

Because Heights can be different



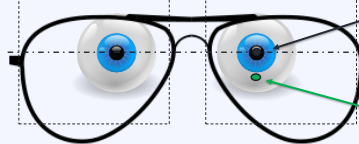
LEONARDO

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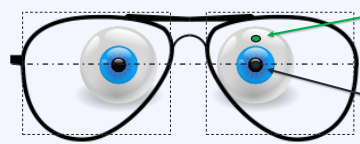
Measure fitting heights

When taking measurements
Observe the patient from the same horizontal plane
"Nose to Nose" and "Eye to Eye"

Observing the patient from above results in a fitting height that is too high



Observing the patient from below or neglecting to correct for "muscle memory", results in a fitting height that is too low



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VERTICAL CENTRATION:
FITTING HEIGHT

The fitting height is measured from the bottom of the box to the center of the pupil.

Remember to add the depth of the bevel.

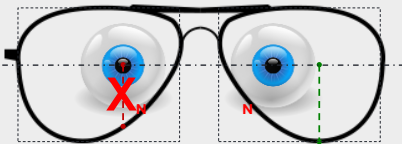
It must be measured on both eyes as they could be different due to possible facial asymmetry.

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Measure fitting height from **pupil center** to bottom of "box."




Pay attention to the frame shape!
(Accuracy does not guarantee a reading area is available)

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Measure fitting height from **pupil center** to bottom of "box."

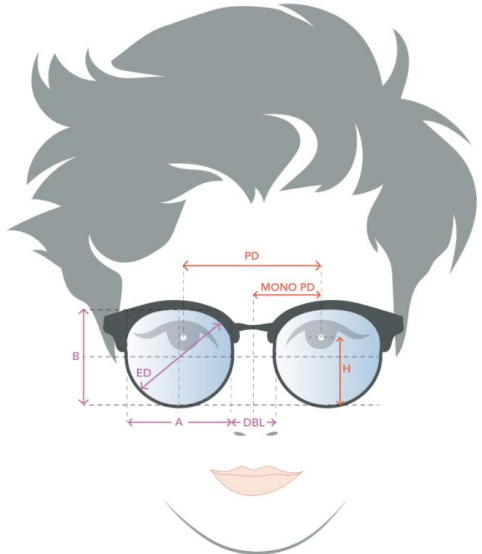
WHAT DO YOU MEAN BY BOX?



Pay attention to the frame shape!
(Accuracy does not guarantee a reading area is available)

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PD Pupillary Distance is the distance between the center of the pupils

Mono PD is the distance between the center of the pupil and the center of the nose

B Measurement is the vertical depth of the boxing

A Measurement the horizontal width of the boxing

DBL (Distance between lenses) is the measurement of the bridge

ED (Effective Diameter) The longest diagonal measurement of the frame

H (Height or Seg Height or Optical Center Height) The measurement from the bottom of the box to the center of the pupil

Geometric Center (GC) – The intersection of the Datum Line and the horizontal centers of each lens shape.

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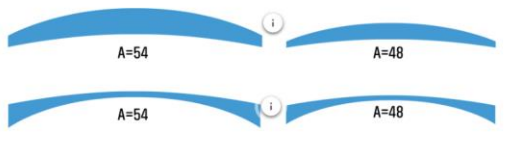
A, B, ED, and PD Measurements are a major component in the thickness of a lens

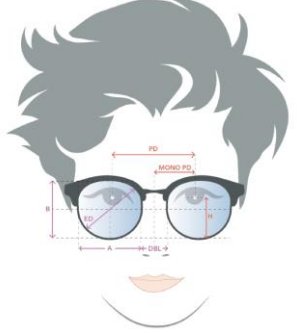
The Boxing System

SHAPE

It's all about the Effective Diameter (ED).

- Symmetrical, rounded and small shapes have thinner lenses
- Square or asymmetrical have thicker lenses





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Why Decentration is so important especially in higher prescriptions

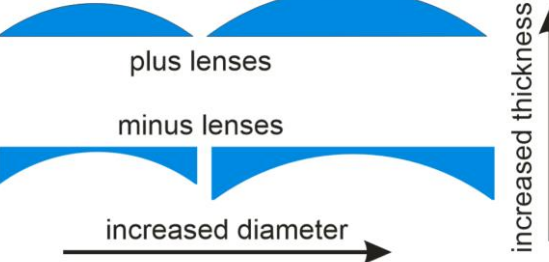
Same Rx

plus lenses

minus lenses

increased diameter

increased thickness



- Lenses will always be thinnest if decentration is 0
- The greater the decentration, the larger the blank needed to edge the lens.
- The larger the blank of any lens, the thicker and heavier the finished lens

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What is Decentration?

Decentration is the difference between the PD of the frame and the PD of the patient

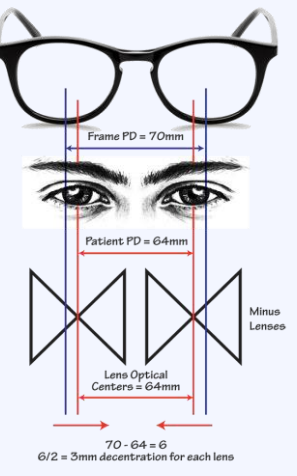
Eye Size (A) + DBL = Frame PD

Frame PD – Patient PD = Total Decentration

If the result is positive, then the patient is decentered inward (aesthetically preferred result)

If the result is negative, then the patient is decentered outward

If the result is 0, (ideal fit and the ultimate goal) the patient's eyes are horizontally centered in the frame



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Lenses

Materials

Coatings


Frames Materials

Frame Shapes

Frame Adjustments

Questions?

Paige Shoven
pshoven@us.Luxottica.com
 214.673.6842



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