Varilux® Fitting Guide

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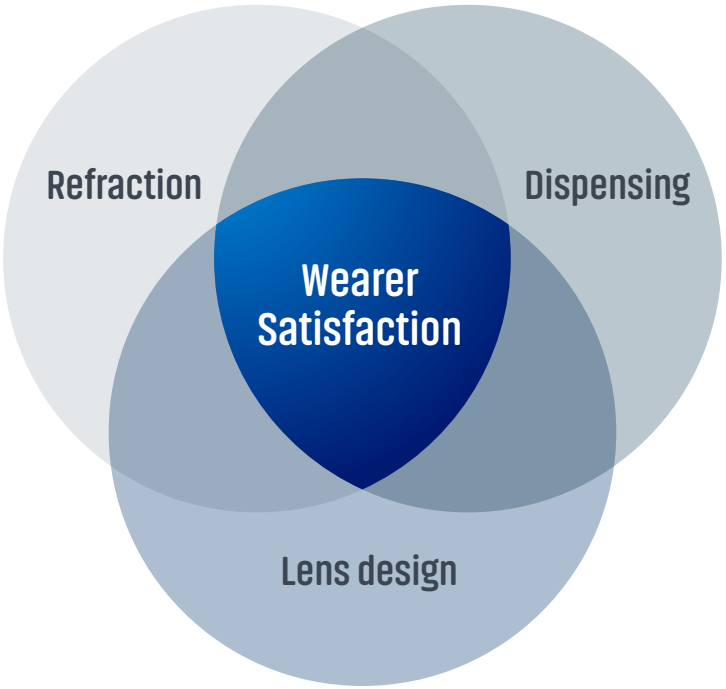
Introduction

Reaching a high level of **patient satisfaction** is a process and it depends on multiple factors: precise **refraction**, superior **lens design** and good **dispensing**.

As Essilor, and particularly Varilux®, we are committed to providing superior lens designs. However, we are also well-aware that it is not enough. We believe that a side by side partnership between practitioners and Varilux® brand experts, as well as a complete and rigorous protocol to follow, is essential to ensure best dispensing. We have high brand standards and we want to help train practitioners to meet the brand requirements.



Objectives:

- To deliver the best visual performance a Varilux lens can offer, by assisting practitioners **from eye exam to delivery** through education on **key technical elements, best practices** and simple **tips**.
- To get the best personalized Varilux lens for the consumer, highlight Varilux visual performance standards and **state-of-the-art personalization**.
- To ensure **best visual performance** thanks to a **rigorous and complete protocol** and provide key actions **in case of troubleshooting**.

Target:

- Practitioners who already have some knowledge about Progressive Lenses
- Those new to the Varilux® brand and product offers and/or those with medium-experience of Varilux products.

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Understanding the patient

Identifying the reasons for consultation

Most consumers do not understand changes in their vision and may find it difficult to communicate their vision problems at the start of a consultation.
Asking the right questions is important in order to guide patients through the process of evaluating their actual needs. Start with general questions to prompt their thinking before moving to specific questions to identify their individual needs.

- What is your age?
- Do you wear glasses or contact lenses?
- What is the reason for your visit?

Remember asking questions all along their journey will aid enormously when choosing the right lens for the consumer

Questions about life habits

What is your age?

What are your hobbies? How much time do you spend indoors/outdoors?

What activities do you regularly undertake?

For example; socializing with friends, cooking, art & crafts?

Describe for me the situations where you feel your vision could be better.

What is your profession?

Describe your normal work activities for me.

What type of work environment do you have? Are you frequently indoors/outdoors?

How much time do you spend in front of a screen/computer?

What type of screens do you use more? (Smartphone, tablet, computer, TV)

What means of transport do you use in your daily commute?

How much driving do you do?

How much of it is at night?

Assessing the symptoms

What is your current solution?

Eyeglasses, contact lenses, none

Do you experience any difficulty seeing clearly? At what distance?

- While reading
- Using smartphone/computer
- Watching TV

Do you regularly experience discomfort?

- Stinging eyes
- Need to squint
- Eye strain
- Headache
- Fatigue
- Neck & shoulder pain

Do you experience discomfort during your outdoor activities?

- Glare caused by sun light on shining surfaces
- Switching between different light conditions

Do you experience any discomfort while driving?

- Blurry vision
- Glare or halos when looking at oncoming headlights or streetlights
- Difficulty reading road signs

Understanding the real visual needs

Spending enough time at this stage asking and assessing detailed questions is of great importance. Together with the results of the eye exam, the answers will allow you to offer/recommend solutions that match the needs of the patient.

It's not just a matter of knowing if the patient shows certain symptoms or not, but also understanding the frequency and intensity of these that will impact the final lens selection(s).

Refer to Essilor® Companion™ Digital Tool for full assistance of lens choice that will match your patient's needs.

Vision examination

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The importance of refraction

Whatever the methodology chosen, refraction is fundamental for clear and comfortable vision.

In the refraction process we know that, **determining the right sphere at distance, compensating the full astigmatism and determining the appropriate addition are key**. The resulting visual acuity is our measure of visual performance throughout the process.

To guarantee maximum visual comfort, it is more important than ever to identify and understand their exact needs.

For progressive lens wearers, there are three specific points to consider to ensure optimum optical performance for your patient: **In the following slides, we are going to show you the impact of some errors in the refraction phase.**

3 key points in the refraction that can create patient complaints about vision.

#1: Sphere at distance not enough "plus"

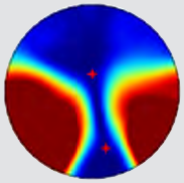
Ensure the distance refraction is not under-plussed due to active accommodation.

Consequence: the wearer will be able to compensate for distance vision but the addition at near will be overestimated or too weak compromising the overall visual comfort

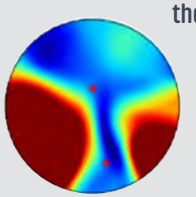
#2: Astigmatism not fully corrected

In all refractions prescribing the correct amount of astigmatism requires specific attention.

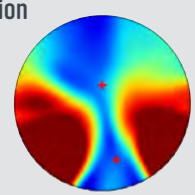
For young ametropes, prescribing the full astigmatic correction step by step can be the rule. For progressive lens wearers the full correction is important as residual astigmatism may be impacted by the astigmatism progressive lens surfaces creating visual discomfort for the wearer.



Fields of view with the correct refraction



Impact of uncorrected sphere



Impact of uncorrected cylinder 0,50x0°

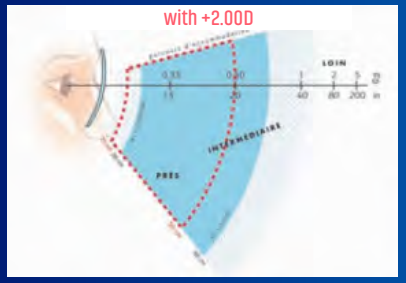
#3: Addition at near too high

There are four main reasons why the addition may be too high:

- the distance prescription is too weak
- the testing distance at near is to close
- wearers sometimes prefer an extra +0.25 for its magnification affect
- over-prescribing by +0.25 to try and give the Rx a longer lifespan

Consequence: an addition that is too strong reduces both the width and depth of filed, as it increases peripheral aberrations and leads to patients using the intermediate vision zone to read.

Field of Vision of a presbyope



Single vision lens with power +1.50D

Progressive lens with near addition +1.50D

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Points to remember moving from refraction...

When prescribing a progressive lens, each value of the prescription sphere cylinder and axis requires specific attention.
The starting point is good refraction which delivers the right prescription.

Starting Sph (C) axis values from former prescription or objective refraction

Sphere

Get the maximum plus sphere by using fogging method:

Fog +1.00 or 1.50 to get a drop of visual acuity, then defog step by step until you get the maximum plus sphere that provides best visual acuity.

"Remember that refraction has not been undertaken to infinity: add -0.25 D to the sphere if necessary."

Cylinder Axis Cylinder Power

Determine the astigmatism, using the crossed cylinder(0.50 for axis, 0.25 for power) looking at the medium line of letters or target of points. Rapidly twirl the cylinder and ask their preferred position until you get equality.

"Be careful with low astigmatism, it often varies. Moderate prescriptions with oblique axes may give rise to distortion."

Sphere

Adjust monocularly the sphere, as the value determined in step one can differ following the astigmatism correction.

Then balance the binocular vision by dissociating the vision and fogging +0.50 binocularly. Refog the eye with best visual acuity, then defog both eyes simultaneously to get the best visual acuity.

"Give priority to the sighting dominant eye: do not reverse ocular dominance between the eyes.

In cases of anisometropia, give the minimum possible difference between the right and left eye."

During these stages, thanks to recent Essilor Innovations, you can benefit from the Digital Infinite Refraction™ methodology, marrying continuous variable lenses and algorithms to perform in a more secure, easier and faster way. Thanks to the smart protocols, you will benefit from an automatic adjustment of Cylinder, Axis and Sphere at the same time.

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... To Prescription

Though you have the values that compensate the refractive error of the eye, it's not a given that you've reached the best solution for the wearer.

To determine the final prescription, examine the anamnesis specific to your patient's needs, wearing history and symptoms with their current spectacles, keeping in mind those key elements.

Result to get: Sph (Cyl) axis

	Sphere	Cylinder Power	Cylinder Axis
Difference with prior prescription	>0.75D	>0.50D Pay attention to the perception of swim effect and distortion	> 10°

In any case, check the visual acuity and the patient's comfort, check on trial frame and adjust lens power accordingly to determine the most suitable prescription.

Technical focus: ESSILOR® AVA™ EXPERIENCE, The most accurate Varilux® Lenses

Providing your patients with the best vision possible, starts with an efficient and accurate refraction. Essilor® AVA™, a unique and comprehensive refraction experience, helps you provide 'Advanced Vision Accuracy' to your patients in their daily activities.

Essilor® AVA™ is based on two technological pillars:

1 A more precise refraction based on **0.01 D increments**, is achieved through Essilor's breakthrough phoropter, the Vision-R™ 800. Thanks to a revolutionary optical module containing and **a smart refraction program**, it enables eye care professionals to easily perform an **accurate and more precise subjective refraction** through a smoother and reassuring experience for the patient.

2 Together with Essilor's high-end lens designs such as Varilux®, practitioners can take advantage of the most precise manufacturing capabilities available and provide their patients with an exceptional level of vision sharpness, and comfort, in lenses that are easy to use.

A clinical study from a third independent party has demonstrated that[1]:

- The Vision-R 800 led to the similar, yet more precise refractions in 100% of patients.
- Patients had higher confidence in the Vision-R 800 outcome than they did in the traditional subjective refraction.
- You can finely explore your patient's vision. For example, finding even the smallest levels of visually disturbing astigmatism, or the maximum positive sphere power to maximize your patient's accommodation control while still ensuring an excellent level of visual acuity at all viewing distances.

81%
of patients experienced a high level of precision during both the Essilor® AVA™ eye exam and wearing their Essilor® AVA™ lenses.[2]

78%
of patients agree to say that Essilor® AVA™ would provide them with better eye care than the current standard.[3]

1. Essilor® AVA™ clinical evaluation of patients experience - third independent party study - US – 2019-2020 - Based on results about refraction and visual acuity data - n=110/116 Refractions (sphere & astigmatism), n=64/116 Visual acuity measurements
2. Essilor® AVA™ clinical evaluation of patients experience - third independent party study - US – 2019-2020 – N=116. % who «strongly agree» or «agree» on «I experienced a high level of precision both in the eye exam (glasses prescription check) and throughout the eyeglasses wearing period.»
3. Essilor® AVA™ clinical evaluation of patients experience - third independent party study - US – 2019-2020 – N=116. % of « strongly agree » & « agree » - 5 points agreement scale with neutral option – N=88/116 AVA Concept evaluations.

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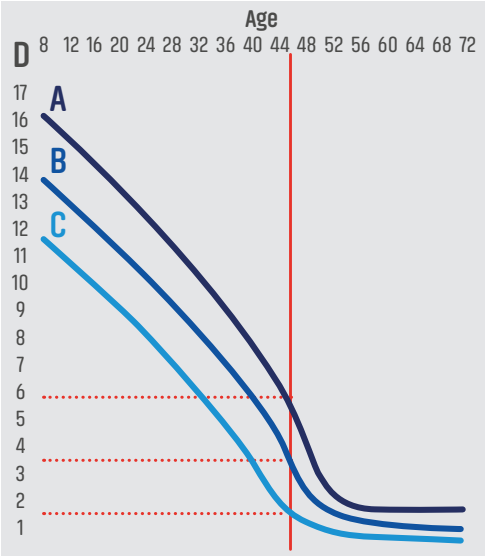
Near Addition to compensate for the loss of accommodation

When assessing the near vision addition, an accurate distance vision prescription (maximum plus and best visual acuity) will ensure the most comfortable near vision prescription. **The correct near** addition is key for presbyopic patient's.

Statistics are useful to give you an idea but accommodation is different from one person to another. Duane's curves show **a real variation between patients of the same age**.

Today, prescribing the addition is highly dependent on near vision usage, especially when considering the distance of tasks and objects and the patient's residual accommodation.

Accommodation curves



Example at 45 years old
Reading distance 40cm

Curve A	No addition
Curve B	0.75 addition
Curve C	1.25 addition

Near vision tasks vary from one patient to another.
Digital devices have shortened near vision viewing distances, nonetheless an overestimated addition remains one of the primary causes of poor progressive lens adaptation.

You can refer to several methods: Near Vision acuity testing, Accommodative Reserve Method, Minimum Addition Method, Fixed Crossed Cylinder, Duochrome Near Test...

The finalize addition will use your skillful assessment of :

- Actual addition required for the patient's everyday near vision distance.

- Due to its magnifying effect, presbyobic patients may accept a higher addition during the refraction but an addition that's too strong will shorten the near point and limit depth of field

- Presbyobic patients with specific near visual needs, such as working on a computer, may need a dedicated Varilux® solution to maximise visual comfort for near and intermediate visual tasks (e.g. Varilux® Digitime®).

Some helpful checks for visual comfort and the addition, before ordering any lenses:

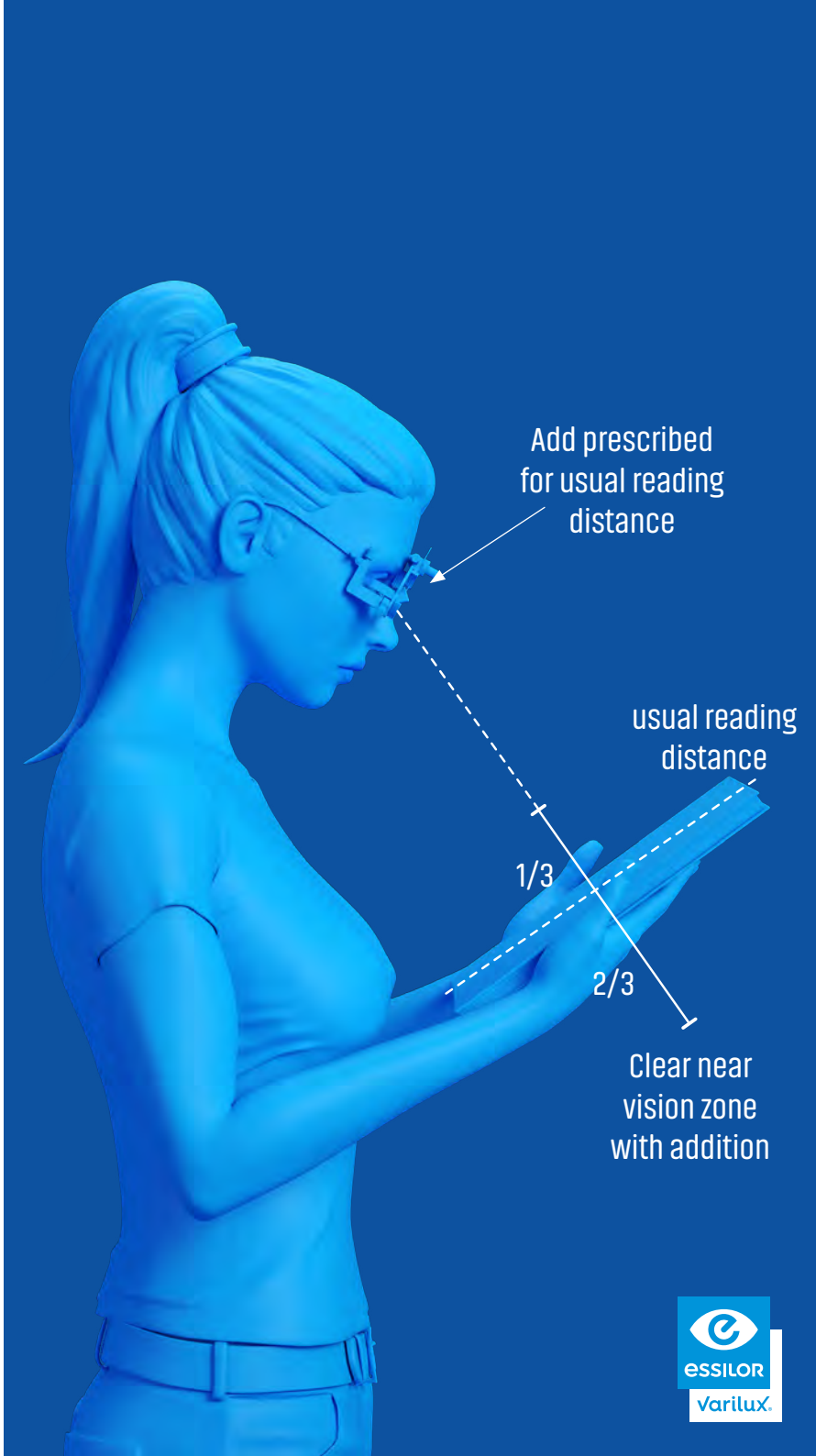
For assessing near vision, place the full refraction result (Sph, Cyl, Axis, Add) in a trial frame:

Method 1 Check the comfort when reading at near

Most patients will only use two-thirds of their total amplitude of accommodation at their usual working distance. The addition compensates for this when viewing at their working distance.

To ensure comfort and the correct value of addition, with the patient wearing the near vision correction, have them position the reading chart at their usual reading distance.

1. Bring the test card forward until they report blur, note the distance
2. Do the same in reverse
3. Values of distances should be 1/3 forward 2/3 backward
4. The nearest point of clear vision should usually be located between 20 and 25 cm

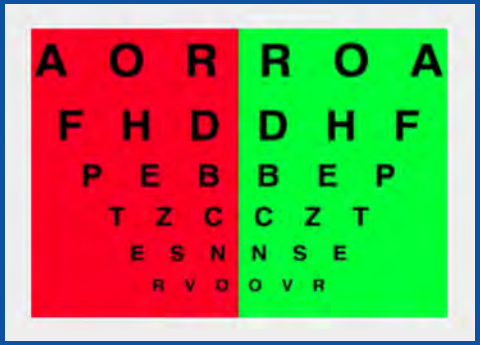


Method 2 Red-Green Duochrome Test at Near

With the patient wearing the near vision correction, have them position the Duochrome at their usual reading distance.

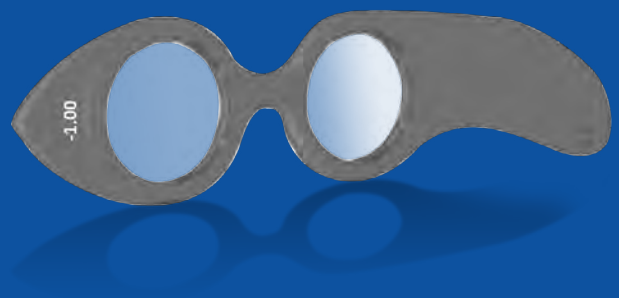
As with a distance duochrome test:

- letters darker on the green means the add is possibly too weak
- letters darker on the red means the add is probably too high
- Red and Green are equally dark the add is correct



Method 3 The -1.00D Test

Place a - 1.00 D lens in front of the patient's near vision correction:
if the smallest characters can still be read, even if with some difficulty, the addition is probably too strong.



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Frame selection

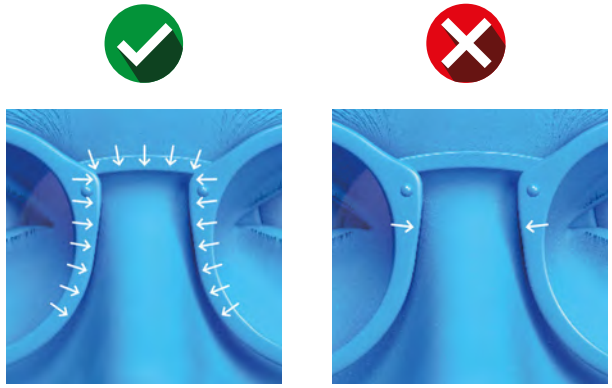
Selecting a frame

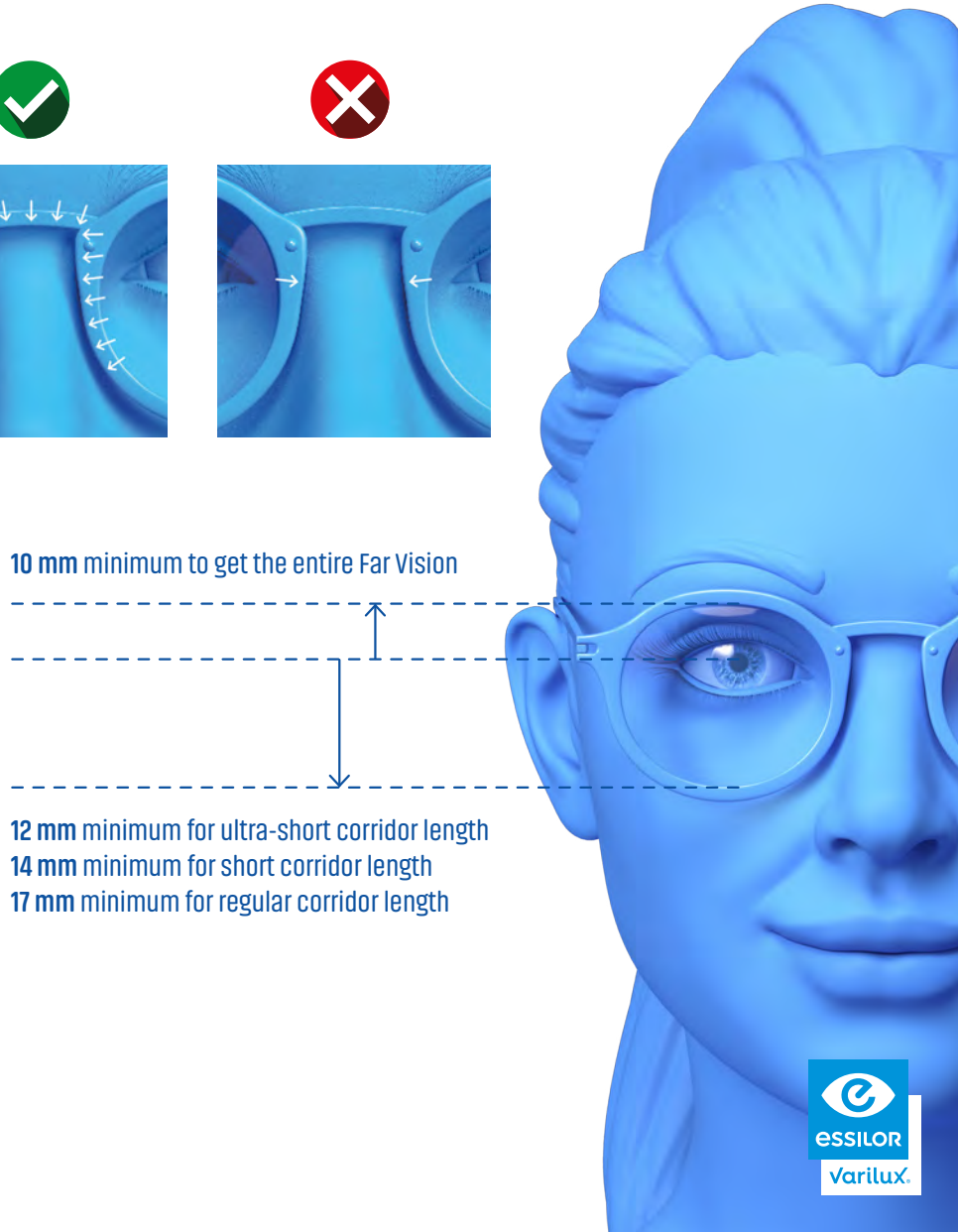
Frame choice is crucial to lens performance. A frame matched to the facial features and prescription of the wearer will help guarantee satisfaction.

Select a frame:

- That is the right size for the wearer's face:
  - a. If the frame is too big, it will slip forward
  - b. If the frame is too small, it will press on at the wearer's temple
- That has enough depth to allow sufficient distance and near vision. Ideally the pupil reflex should be:
  - a. about 10mm down from the inside of the upper frame rim and
  - b. at least 17mm* above the inside of the lower frame rim

*If the Fitting Height is less than 17 mm, choose a short corridor progressive lens. 17mm is the minimum requirement for the wearer to benefit fully from the near vision zone.





Technical Focus & Tips:

It is essential to ensure the wearer's comfort. If they are not comfortable, they will not be satisfied with their glasses.

Check if the chosen frame is suitable for progressive lenses. Make sure the frames provides enough space to cover all the vision zones.

Ask the wearer to relax, ensuring you get their **natural horizontal gaze direction.**

Adjust the frame reproducing subsequent wearing positions. Be sure to make any necessary adjustments to the frames before taking measurements.

Additionally, it is important to maintain these adjustments for the full fitting; do not return to the default settings of the frames.

The wearer will also need to fit the frames by themselves, to ensure adequate consideration of the position in which they'll be worn.

The measurements cannot be done properly if:

- The frame size is not chosen correctly
- The frame does not fit comfortably on the nose, especially in the case of plastic frames.

Taking measurements

1. Personalization parameters
2. Points to consider prior to measurements
3. Measuring systems

Taking measurements

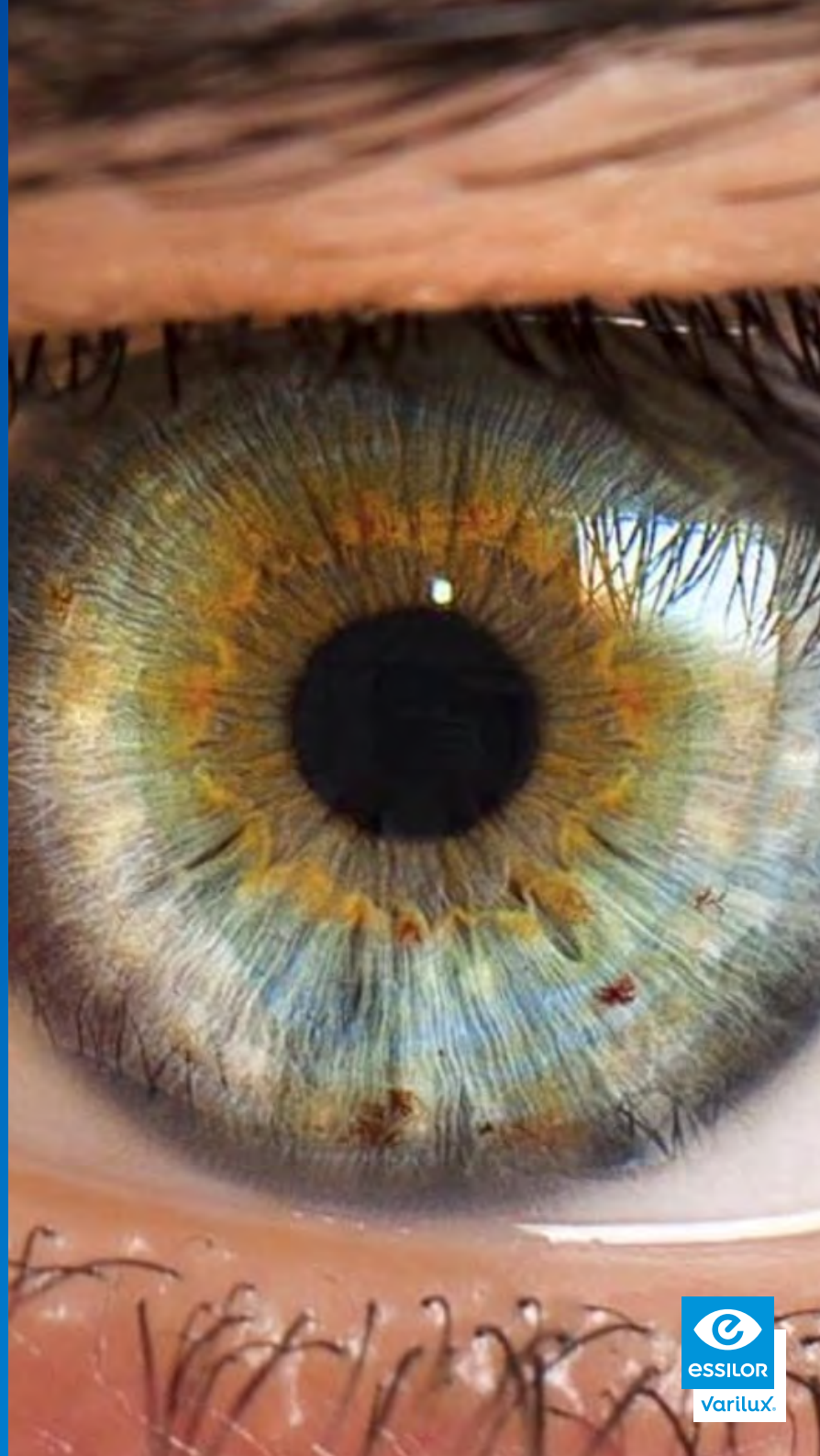
1. Personalization parameters
2. Points to consider prior to measurements
3. Measuring systems

Measurement is a key element of dispensing

Associating the optics of - lens + eye – together produces a unique optical system which results in:

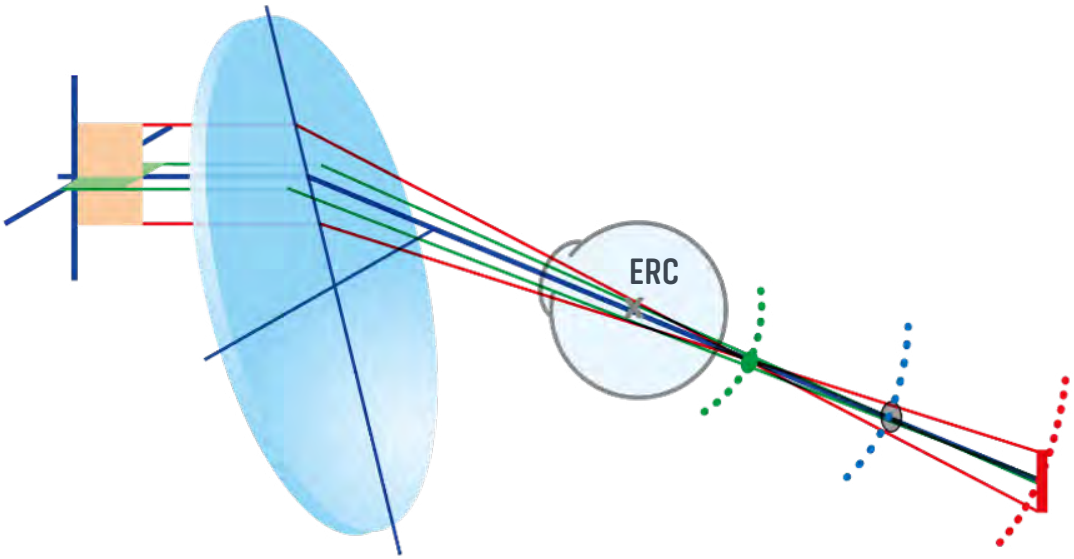
- an optimal image on the retina for all distances
- good binocular vision
- the largest fields of view possible
- minimal aberrations and swim
- natural posture.

To work effectively a Progressive Addition Lens, needs accurate centration



Complex lens design: Calculation for each point on the lens

Calculation over thousands of points on the lens



The complex design of each progressive lens is achieved through a calculation over thousands of points on the lens. There is enormous complexity between an object being viewed, the spectacle lens and the eye.

The key element is the alignment of the optical system and the **Eye Rotation Center (ERC)**

To achieve a highly accurate lens design and optimal performance for the wearer, we need:

1. Refraction and the expected near addition
2. Exact position of the lens back surface in relation to the wearer's ERC.

Personalization

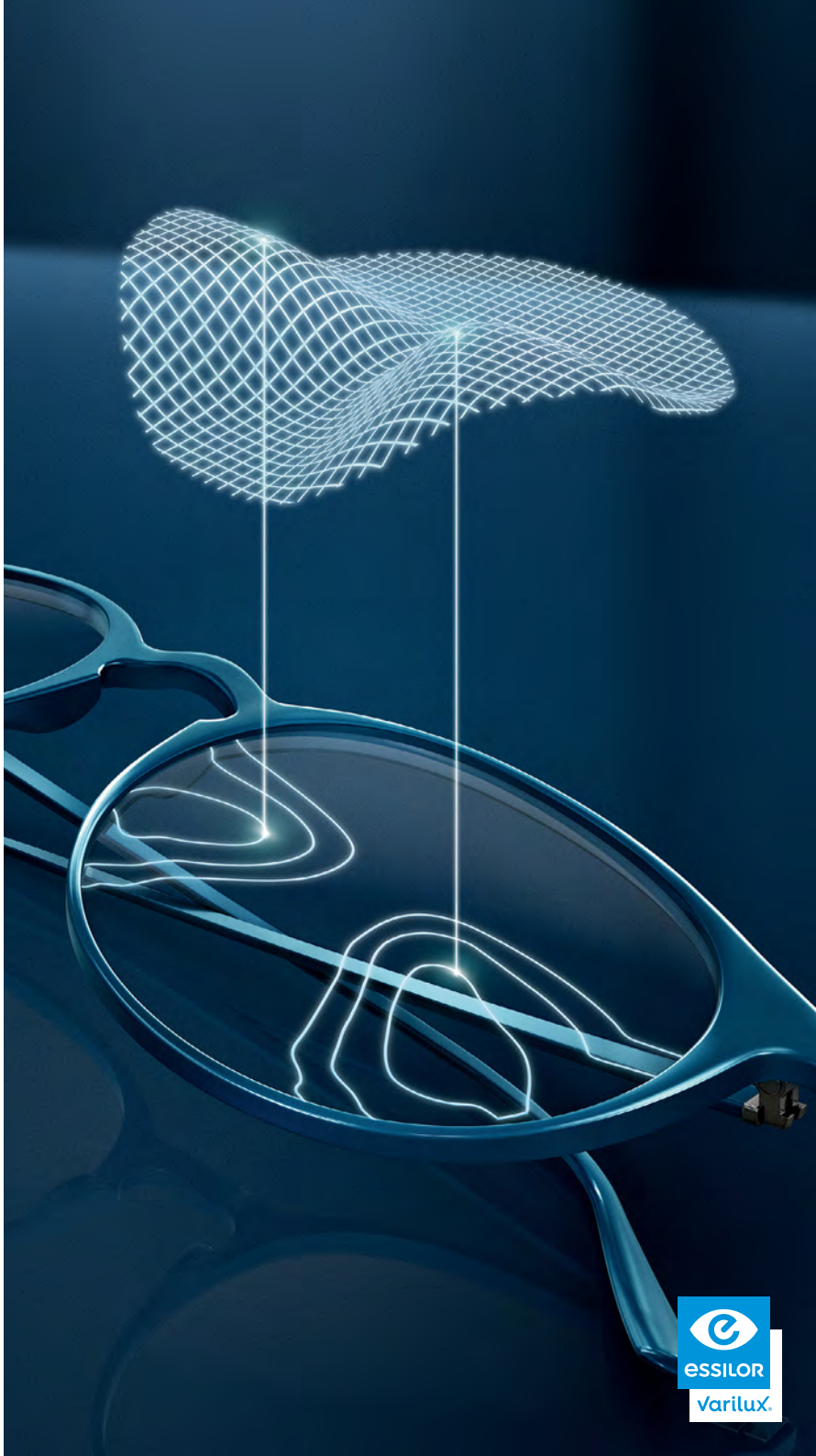
Why is the personalization important?

By taking into account parameters beyond the prescription, we can offer the patient:

- All the benefits of the intended design even if the parameters are far from the standard ones
- Improved vision and comfort, tailoring the design depending on his behavior.

The following personalization options are available with Varilux®:

			Exclusive to Varilux®		
PDs and Heights	3D position of the lens: Vertex distance Pantoscopic angle Wrap angle	Progression Length Manual Inset Reading Distance	Eyecode®	Near Vision Behavior (NVB)	Dominant eye

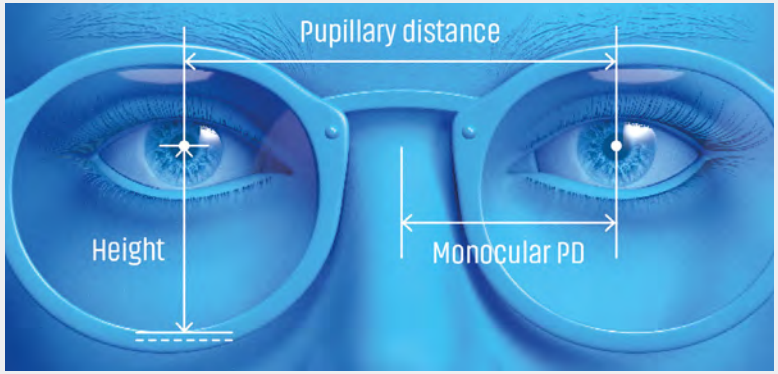


Personalization - Pupillary Distance (PD)

Parameter

The distance (in mm) between the two corneal reflections.

Pupillary distance is the sum of the two monocular measurements.

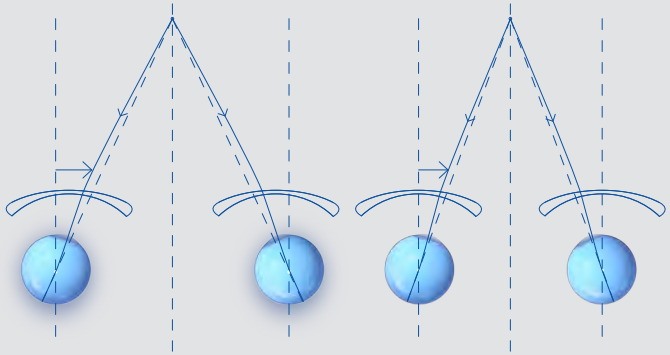


Standard values:
Monocular PDs: 32 mm

Variability
Monocular PD depends on the anatomy of the wearer.

Impact on the design and vision

Monocular pupillary distance has an impact on the inset and the balance of the field of view in intermediate and near vision.



Inset is optimized providing a better corridor and better localization of the near vision.

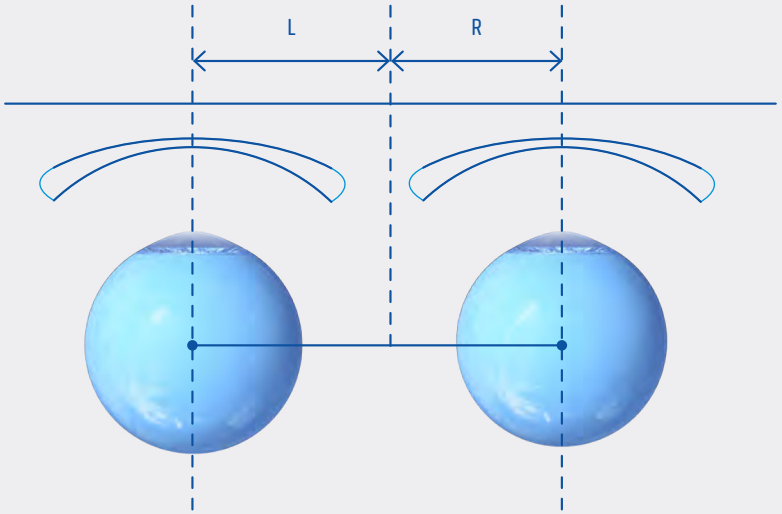
Actions to take

Regardless of the Varilux® lens on order, monocular PD should always be submitted. This value will be taken into account in the calculation of the design.

Measurement:
Manual tools
Digital (Eye-Ruler™ 2, Visioffice®)

Personalization - Pupillary Distance & Fitting Height

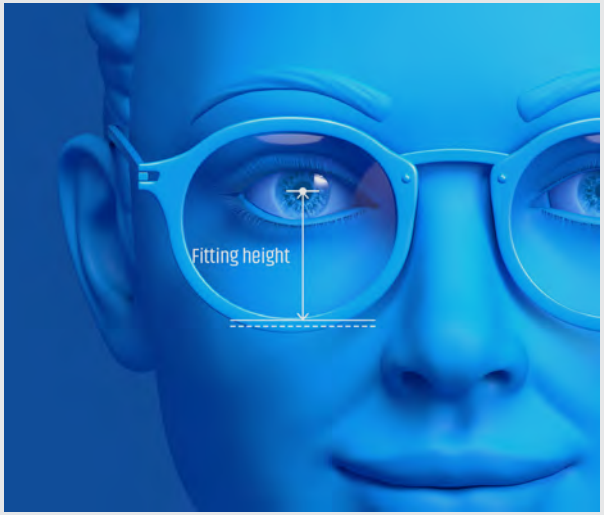
Pupillary Distance (PD)



Monocular PD for mounting is based on the middle of the bridge and the corneal reflection with the frame as reference

Always use monocular PD. Never use full PD divided by 2 as we are not symmetrical.

Fitting Height (FH)



Height is the vertical centration distance at far vision between the corneal reflection and the bottom of the lens inside the frame using Boxing.
If the lens is already mounted in a frame, make sure to take into account the part hidden in the frame.

Always fit with Pupillary Height of each eye separately.

It is not possible to dispense any Varilux lenses without monocular PD and Height measurements.

Certain Varilux designs may require extra personalization to deliver the targeted performance.

If PD and FH are measured out of the described methods (or through online tools),
it is highly recommended to have them cross-checked by a optical physical professional

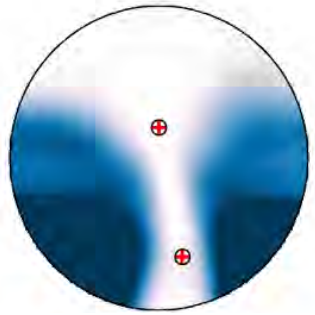
Impact of inaccurate centration

Some issues that might arise:

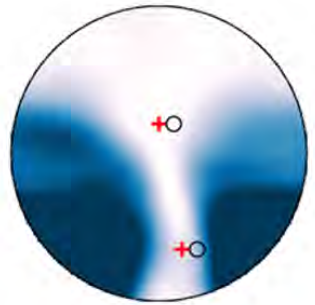
- Need to turn head
- Looking for a clear zone of vision
- Too narrow visual field.

The accuracy of the centration is even more important with advanced designs, to ensure the benefits of these technologies are fully realized

+ Fitting cross
○ Actual mounting

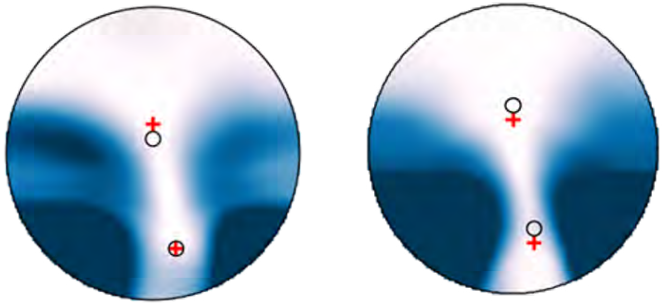


Normal fitting



Fitting error
on horizontal axis

The design is then shifted and deformed with respect to the wearer's eye

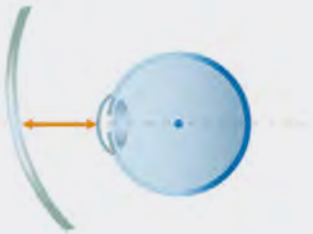


Fitting error
on vertical axis

Personalization - 3D position of the lens

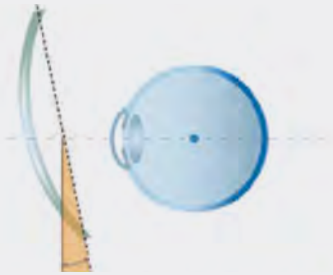
Parameter

The 3D position of the lens compared to the ERC is given by 3 values:



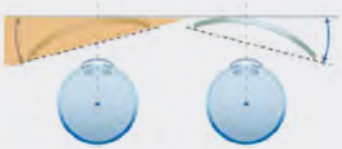
Vertex distance/ ERC
The distance between the rear surface of the lens and the apex of patient's cornea

Standard value: 12 mm



Pantoscopic angle
The angle between the lens plane and the vertical plane

Standard value: 8°



Wrap Angle
The angle formed by the plane passing throught the edges of the right or left calibre of the frame - at its two extremities - and the plane tangent to the frame's bridge in its middle.

Standard value: 2° or 7°

Impact on the design and vision

If the lens position differs from the standard values, this will impact the perceived field of view.

Taking the real position of the lens into account in the design calculation will ensure optimal benefit of the design for the wearer and respect necessary fields of view.

Actions to take

Even after the adjustment, if the lens position is still different than the standard values, the customized values should be taken into account, choosing a design with FIT option.

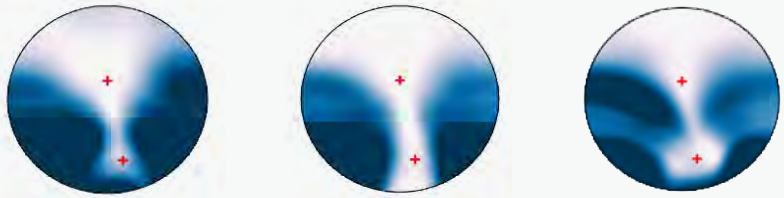
Variability:
The position depends on the frame, its adjustment and the wearer's facial anatomy.

Measurement:
Manual (5D ruler)
Digital (Eye-Ruler™ 2 Visioffice®)

Technical focus: Impact on lens and vision performance

When the actual measured values move away from the standard values, we see these effects:

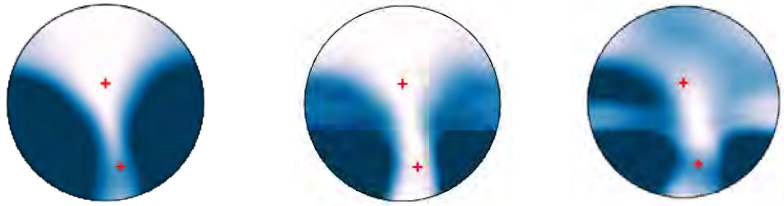
Vertex distance



6mm | Standard 12mm | 25mm

1. A change in visual acuity at reference points (Near & Distance)
2. Reduction of width of visual fields in near vision, in intermediate vision and far vision.

Pantoscopic angle



-5° | Standard 8° | 20°

1. A change in visual acuity at reference points
2. Degradation of fields width and visual acuity in near vision.

Wrap angle

0° | Standard 7° | 20°

1. A change in visual acuity at reference points
2. Visual acuity loss in near vision loss in near vision
3. The visual fields become dissymmetric in far vision, intermediate vision and near vision.

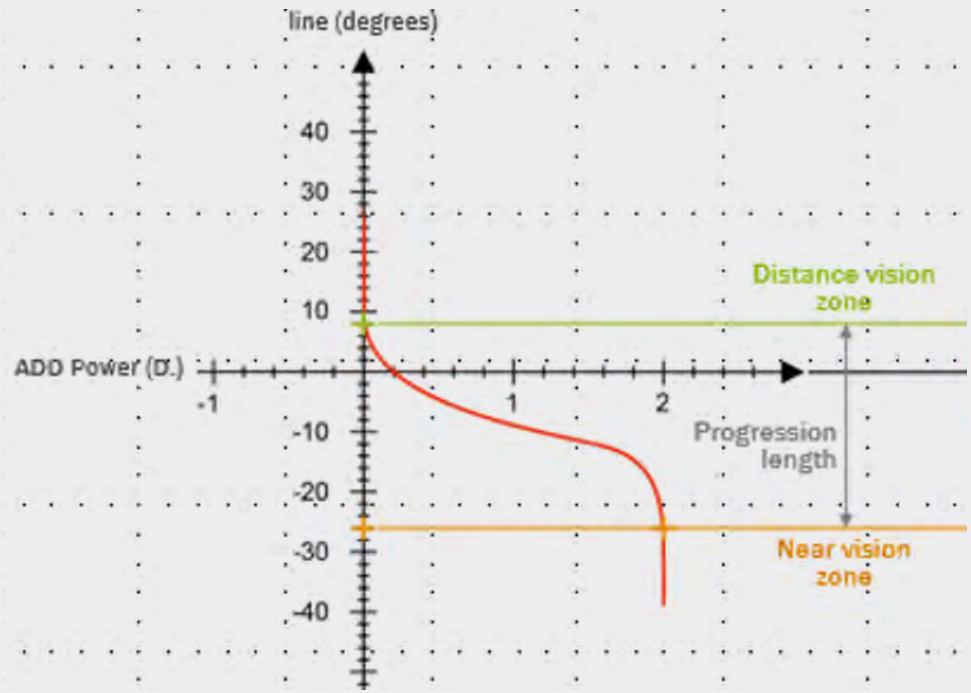
When the measured values are far from the standard ones, you might consider the FIT option.

ESSILOR Varilux

Personalization - Progression Length

Parameter

Progression Length (PL) is the vertical distance between the fitting cross (far vision) and the near vision (100% addition)



Variability

There are 3 categories of progression length for Varilux® lenses:

- regular (min FH 17 mm)
- short (min FH 14 mm)
- ultra short (min FH 12 mm)

Impact on the design and vision

The shorter the length of progression is:

- The faster the near vision is accessible

however

- the greater the reduction in the intermediate zone
- the greater the increase in unwanted astigmatism.

Actions to take

Short corridor is a better option in the following cases:

1.Spectacle frame
smaller frame > shorter corridor

2.Anisometropia
to reduce the prismatic effect in vertical meridian

Personalization - Reading distance

Parameter

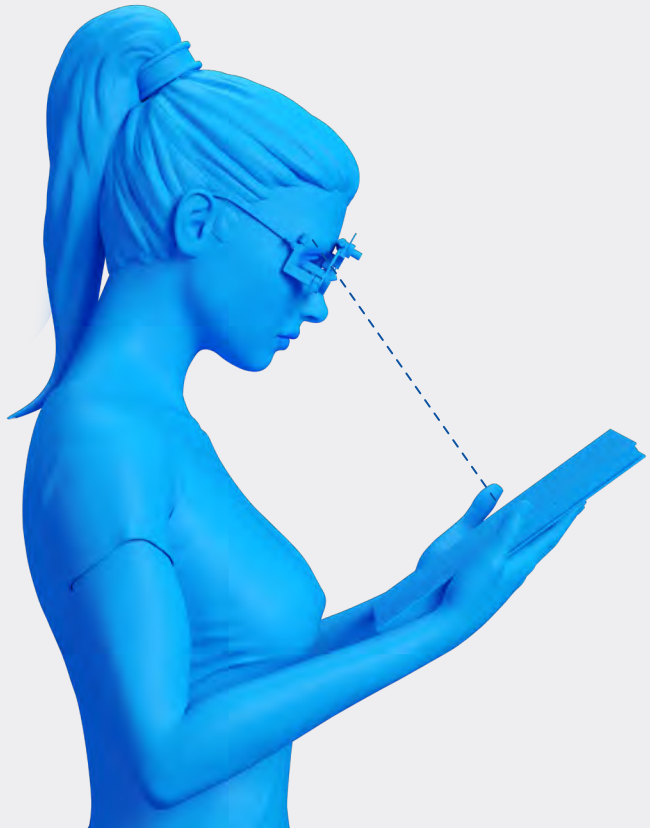
Natural and comfortable distance to read

Standard value: 40 cm

Variability

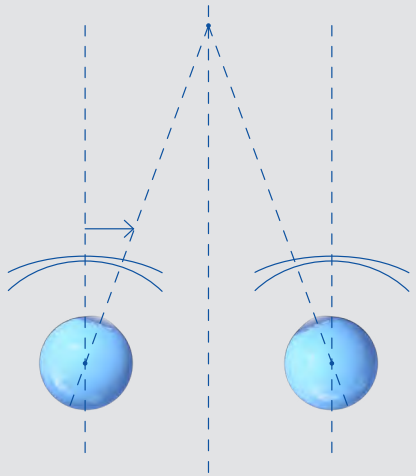
Reading distance depends on the morphology of the wearer (Harmon distance)

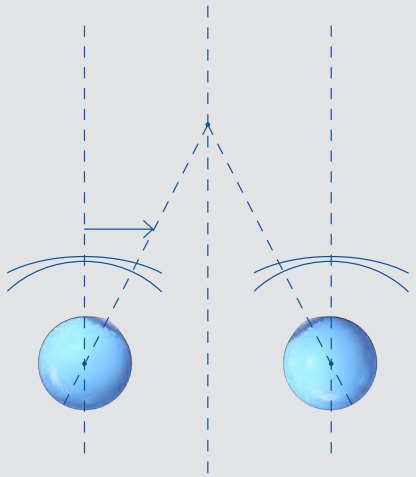
Visual needs and activities



Impact on the design and vision

Better localization of near vision





Actions to take

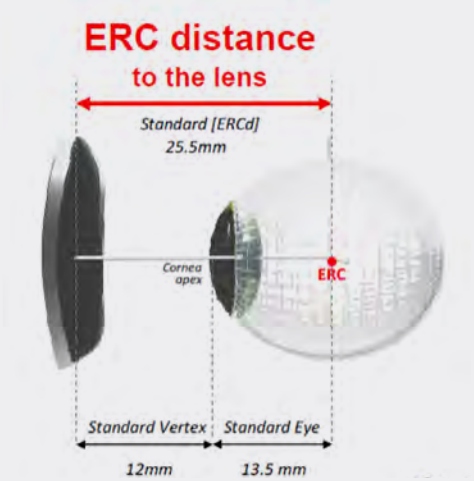
As soon as the reading distance is different than 40 cm, the customized value should be taken into account.

Measurement

Manual (ruler band)
Eye Ruler™ 2
Visioffice®

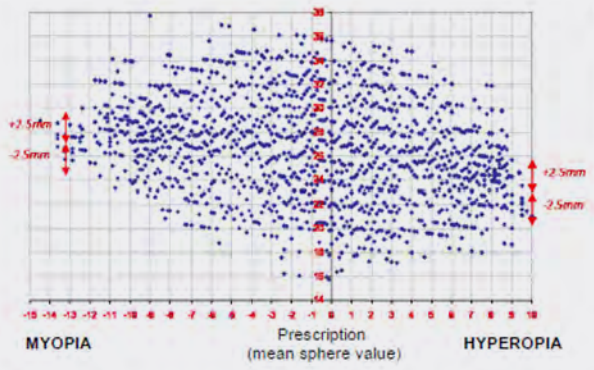
Personalization - eyecode®

Parameter



ERCd: Distance between the back surface of the lens and the Eye Rotation Center (ERC)

.



Variability

ERC varies from one person to another. Dispersions are observed for the same ametropia value which confirms the uniqueness of each eye.

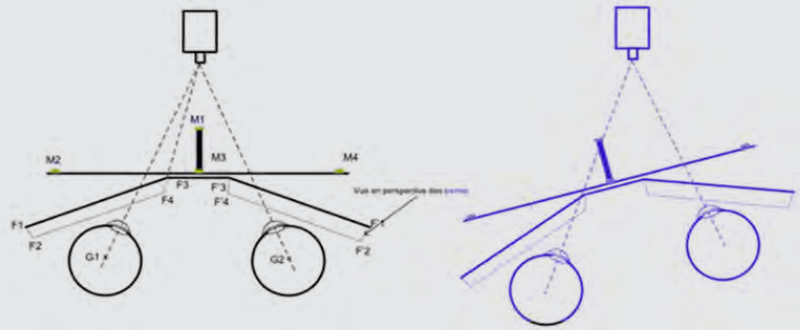
It depends on:

- The length of the eye
- The frame
- The facial anatomy.

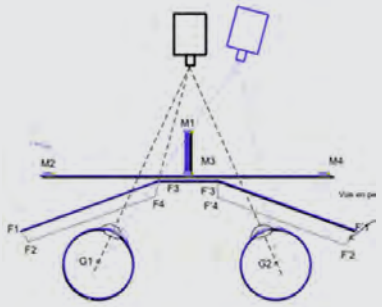
Measurement

It can only be taken with Visioffice

> 2 pictures taken with a difference of 20° for the fixation point



> 3D construction of the boxing and localization of the ERC

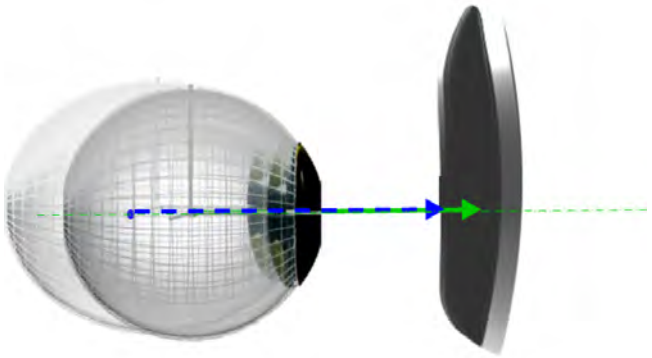


Decision

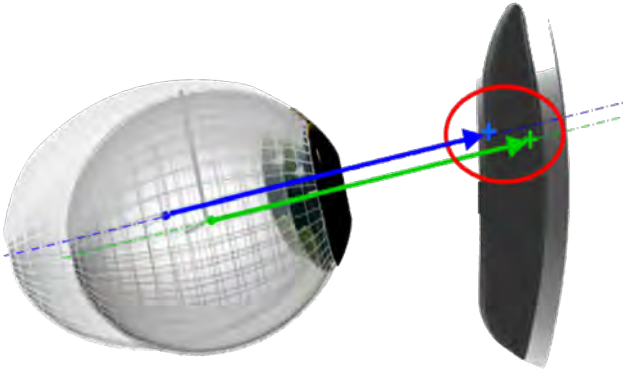
Systematic for all the wearers

Technical Focus: Impact on the design and vision

When the wearer looks straight ahead, whatever the ERC distance, the visual axis of their eyes will go through the same point of the lens: at the point of fitting cross.



As soon as the wearer looks into the distance with a certain eccentricity, the visual axis won't go through the same point of the lens.



When the ERC distance is 25.5 mm, the visual axis will go through the correct point of the design.
If not, a mismatch between the calculated design and the visual need occurs.

• With eyecode® we stretch or compress the design to adapt it to the real ERC Distance in order to give the best of each Varilux® lens.

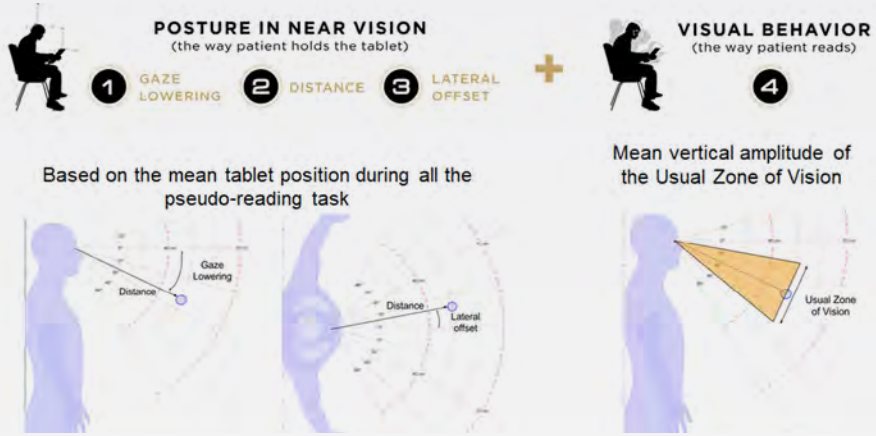
Personalization - Near Vision Behavior

Parameter

NVB is a measuring protocol to assess patients' visual needs and optimize the shape and position of vision volume.

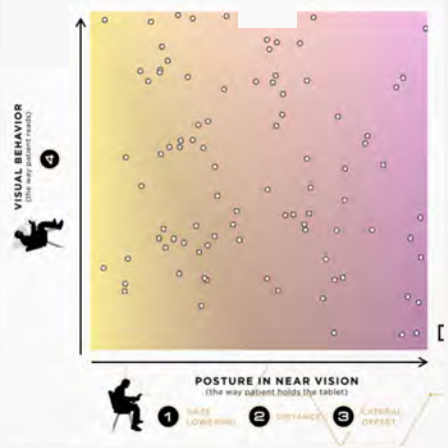
It takes into account:

- the posture of the wearer in near vision:
  - gaze lowering (degrees)
  - reading distance (cm)
  - lateral offset (degrees)
- the visual behavior: the approach and preferences of the wearer when reading a page, via eye or head movement.



Variability

No correlation with the Refraction.

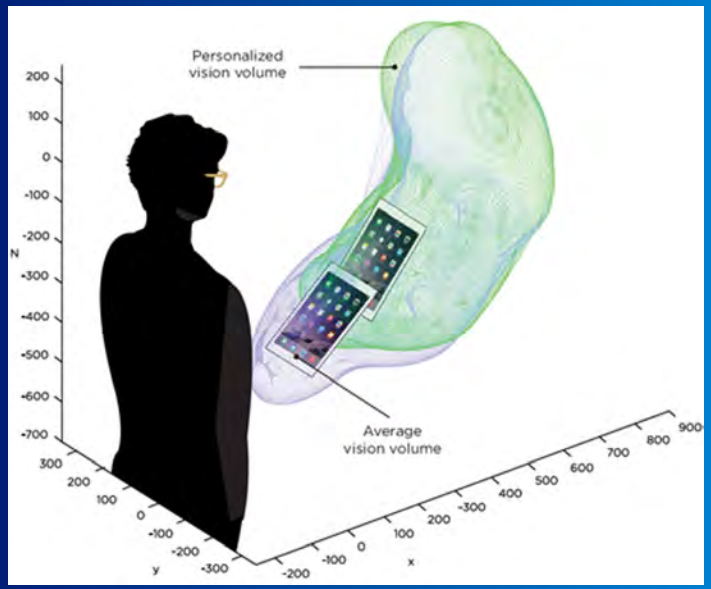


Data collected by R&D over 90 people

Impact on design and vision

Customize the design to adapt the volume of vision to the volume of needs of the wearer:

- Optimization of the near vision localisation
- Near vertical fields of view adjusted depending on the reading position of the wearer.



Near Vision Behavior task: a dynamic measuring experience

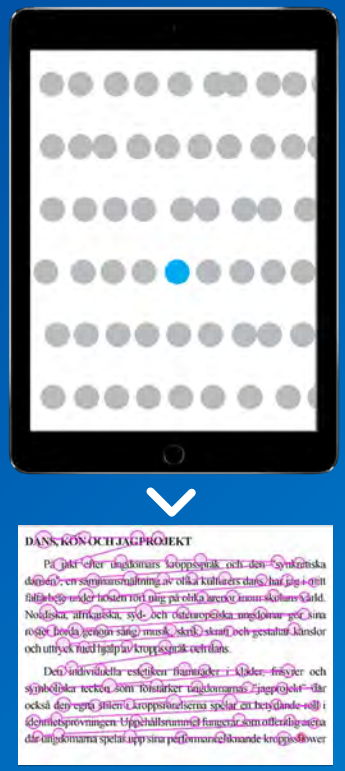
What is measured?

Based on an intuitive, short and easy protocol, the wearer reproduces a regular reading task of daily life in near vision.
The wearer is asked to follow the blue dot while it moves on the screen.
This task replicates the wearer's eye saccades while reading.

How is it measured?

- Measurement performed while seated in a familiar posture
- New frame and without prescription*
- On iPad with Varilux® X series™ app with new frame clip.

A key advantage of this method is that it is easily adapted to specific, regional language's average reading patterns.

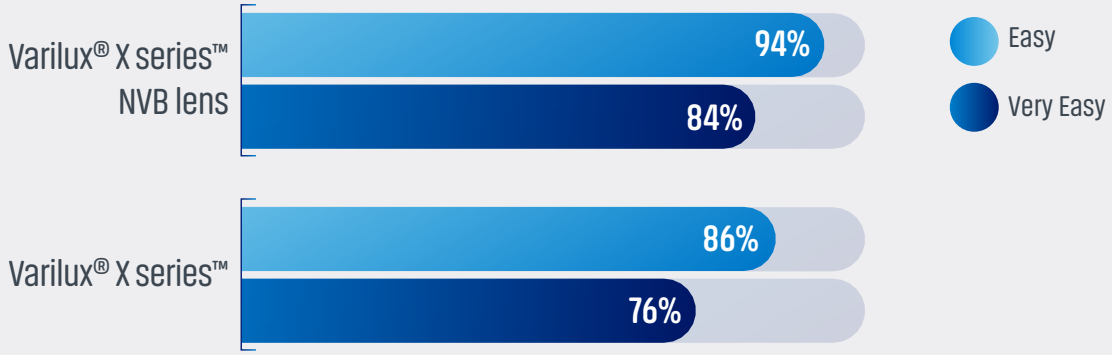


*The task has been designed so that anyone, even those without a prescription, can undertake it (up to -10 diopter)

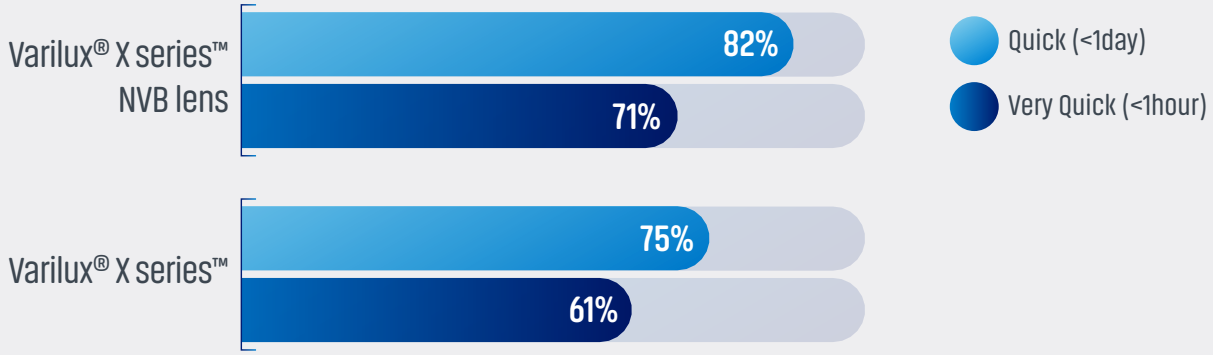
Personalization - Near Vision Behavior

Wearer benefits

% of wearers who experienced an easy or very easy transition from distance to near vision:



% of wearers who experienced a quick or very quick adaptation



The Varilux® X series™ NVB lens is evaluated in the top bars, the Varilux® X series™ lens in the bottom ones.

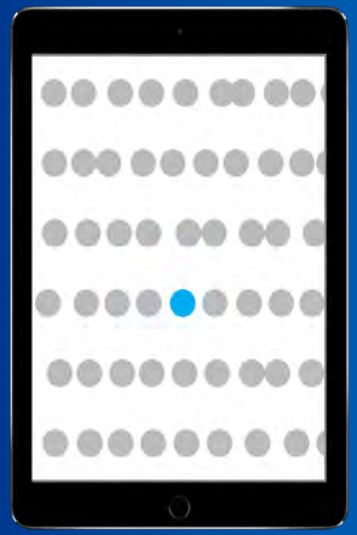
Source: International multicenter study looking at the overall performance and key benefits of the Varilux® X series™ lenses with NVB personalization carried out by Essilor

Actions to take

For all presbyopes

Measurement

Module NVB on Ipad
Eye Ruler™ 2
Visioffice®



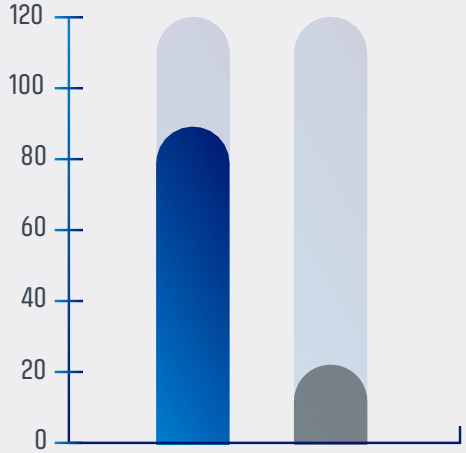
Personalization - Dominant eye

Parameter

Ocular dominance is the tendency to prefer visual input between one eye to the other.

According to R&D experiments, when the design provides optical aberration in front of the dominant eye, wearer reaction time is impacted. It is therefore even more important to favor the performance of the dominant eye in the calculation of the lenses.
By respecting the dominant eye's leading role in the lens calculation, the 4D Technology™, exclusive to Essilor, improves the reaction time of each wearer.

Variation of response time



R&D simulations data

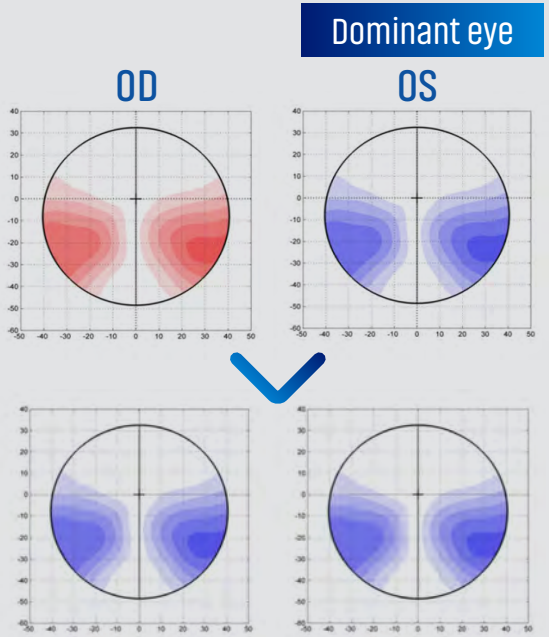
4D Technology™

Blur on the sighting dominant eye

Blur on the other eye

Impact on the design and the vision

Binocular optimization, applying the same, targeted design to both eyes (with a maximum of 2.00 D of anisometropia).



Better reaction time means better dynamic vision

Actions to take

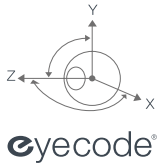
As soon as there is observation of anisometropia this is the logical approach.
Currently, 55% of presbyopes have different prescriptions between their left and right eyes[1].

Measurement:
Manual
Eye Ruler™ 2
Visioffice®

(1) Mean spherical and cylinder difference ≥±0.50D. Essilor mainly Europe and Asia orders data. Progressive lens orders on 2.058M PAL wearers, Jan – March 2019

ESSILOR Varilux

Summary: Personalization Options on Varilux® Designs

					
	PD & Height	FIT DATA	EYECODE® DATA	DOMINANT EYE	NEAR VISION BEHAVIOR
		*pantoscopic tilt *vertex distance *wrap angle *reading distance *PL & Inset	*ERC - PD *ERC - Height *ERC distance *Head Cape		
Varilux® Xclusive™	mandatory	mandatory	mandatory	mandatory	mandatory
Varilux® X track™	mandatory	optional	optional	n/a	mandatory
Varilux® X Design™	mandatory	optional	optional	n/a	n/a
Varilux® E series™	mandatory	optional	optional	n/a	n/a
Varilux® Physio® 3.0	mandatory	optional	optional	n/a	n/a
Varilux® Comfort Max	mandatory	optional	optional	n/a	n/a
Varilux® Liberty™ 3.0	mandatory	optional	optional	n/a	n/a
Varilux® Digitime®	mandatory	optional	optional	n/a	n/a

* The options might change regarding the region. Please check with your local contacts.

Taking measurements

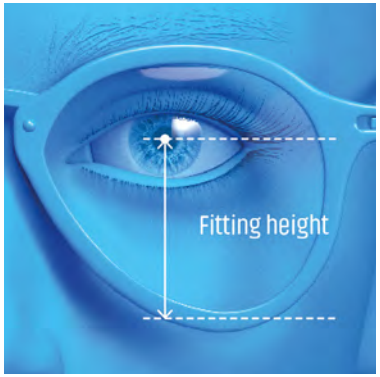
1. Personalization Parameters
2. Points to consider prior to measurements
3. Measuring systems

Reference system - Boxing vs Datum

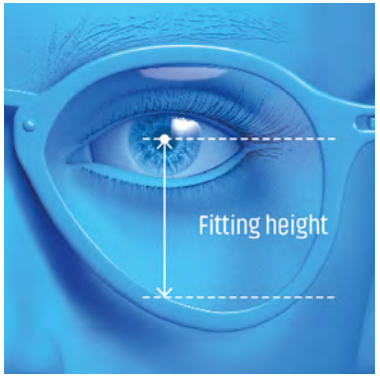
The **Boxing** system takes into account the distance to the horizontal line tangential to the bottom of the frame. **Datum** measures the distance to the point on the edge of the frame directly below the pupil center.

Neither system is preferred over the other, but it's important to ensure the same measurement approach is used throughout the fitting process, including measurement, ordering and mounting.

For ordering, always use the **boxing** system.

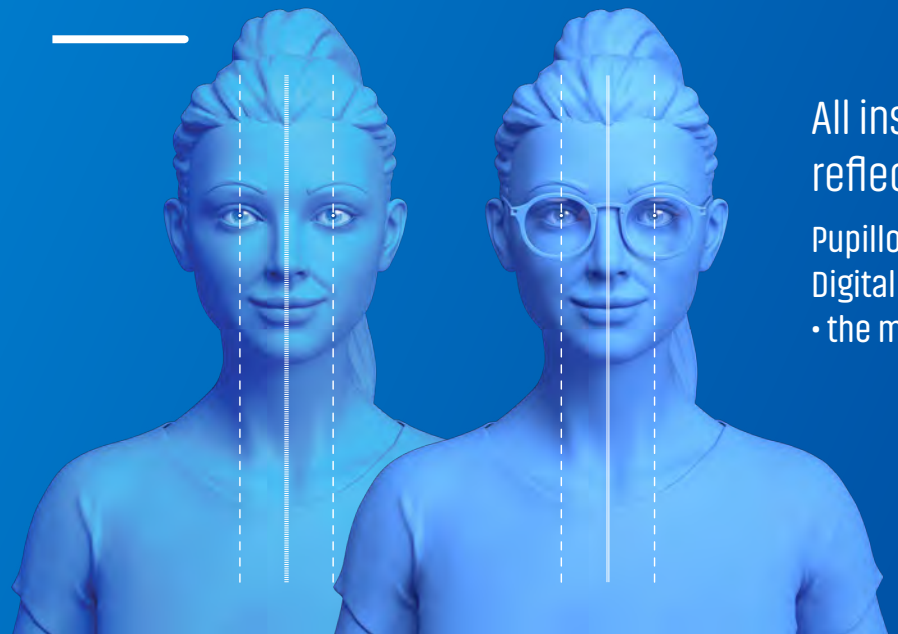


Boxing



Datum

Symmetric Axis - Frame vs Nose



All instruments will provide the same binocular PD between the two corneal reflections, the only difference will be in the monocular PD.

Pupillometer / ruler > Nose symmetric axis
Digital devices > Frame symmetric axis
• the most accurate is the frame symmetric axis as it is also used by the edger.

Posture

Progressive lenses need to be **fitted** to allow a **natural usage posture** in the wearer's daily life because **vision** and **postural environments** can be very different from one wearer to another.

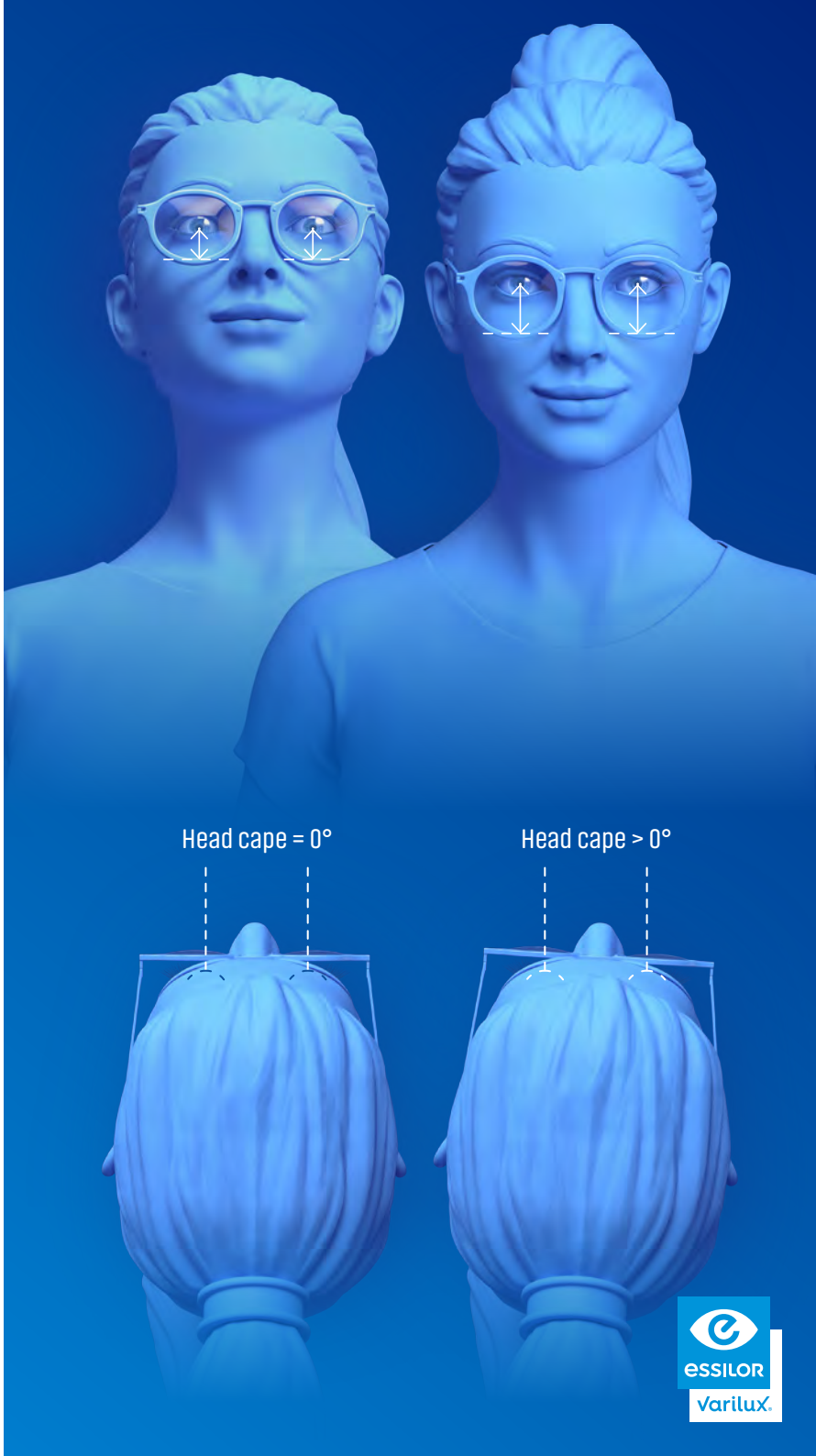
When a wearer **knows** the ECP is going to take measurements, they can instinctively **stiffen up** or adopt an **unnatural** pose, **no matter the tool** used (Eye-Ruler 2, Visioffice, etc.) for measurement.

It is therefore important to observe the wearer when choosing their frames and take into consideration their natural posture.

Specific solutions exist on Visioffice® to take this into account:

Head cape: head posture and associated gaze directions when looking straight ahead (primary position) is unique to each person, and can easily vary by +/-10°. Taking it into account will impact on the monocular PDs (Binocular PD will still be the same).

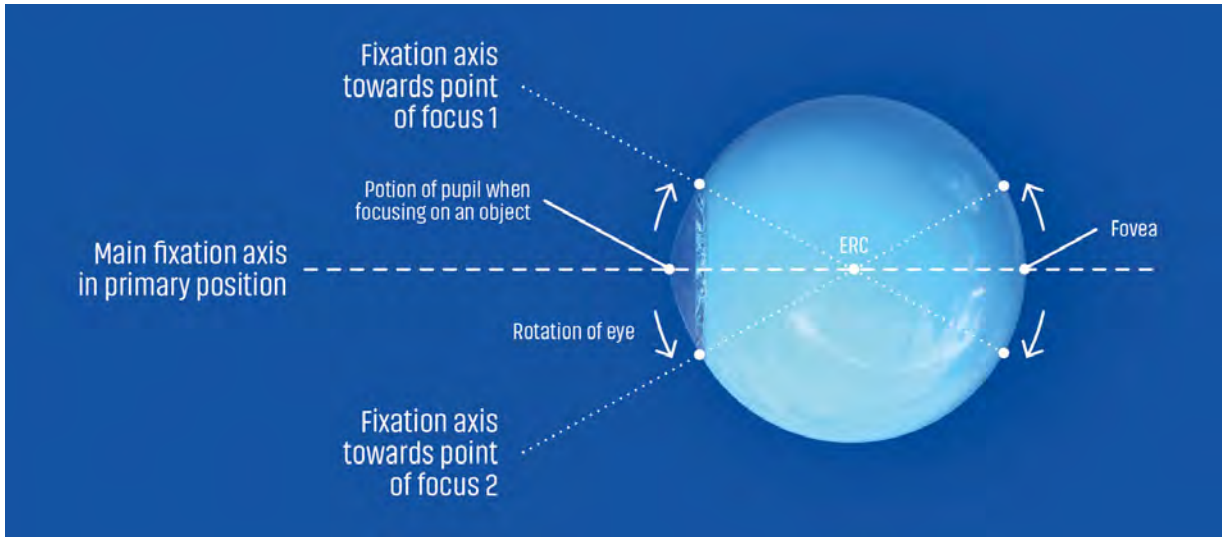
H3D module: the device after following procedure is able to calculate the natural posture of the wearer horizontally and vertically to adjust PD and height measurements accordingly.



Reference for Centration

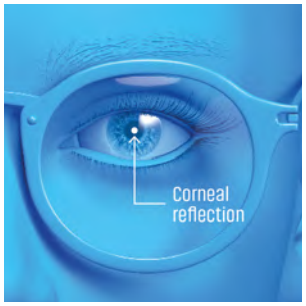
Fixation axis is the representation of a line traveling from the ERC to a point of observation.
When looking in any direction, all the fixation axes entering the eye pass through the Eye Rotation Center (ERC). The ERC is thus an essential reference point for the lens design model.

The reference point for taking measurements is **the axial point where we estimate the ERC to be when the wearer looks straight ahead in natural posture for distance vision**. There are several methods used to estimate the ERC point, the most common being the center of the pupil. However, as described below, **the most accurate method is to use corneal reflection**.



Corneal reflection

The corneal reflection is used to calculate the center of the corneal curvature, which coincides closest to the fixation axis, and therefore the ERC.



Identifying the corneal reflection can be done with a digital device that gives off a light source (flash).

Center of Pupil

Assumption:
the fixation axis always passes through the center of the pupil which is aligned with the ERC.

Reality: The center of the pupil and ERC are almost never aligned. Basing centration measurements on this hypothesis can lead to errors.

Taking measurements

1. Personalization Parameters
2. Points to consider prior to measurements
3. Measuring systems

Methodologies

It is essential to adopt a natural posture to ensure accurate measurements		
Manual	Digital	
Pupillometer Ruler or Height Measuring System (HMS) 5D ruler	**EYERULER™ 2** Technical Advantages: Accuracy (symmetric axis) Repeatability in a team Time Wearer perception	**VISIOFFICE®** Technical Advantages: All the benefits of EyeRuler™ 2 + high accuracy, ERC measurement NVB Dominant eye H3D Head cape
Confirm the alignment of the fitting crosses with the corneal reflections at the end.		

Manual measurement

Principle

Varilux® lenses must be fitted with the monocular PDs and the fitting heights (with any underestimation).

Monocular PDs
Ruler or pupillometer

Heights
Ruler or Height Measuring System (HMS)

Tilt / Wrap / Vertex:
5 D ruler:
PD, FH, Pantoscopic Tilt, wrap angle, vertex distance

Advices

Pupillary distances:
Always take monocular measurements.

Height:
If there is a height difference between the two eyes, be sure to include both measurements.

Don't forget to add the depth of the bevel. (This is done automatically on digital measurement devices based on the choice of frame material)

When using manual measurement methods, it is harder to take consistently accurate Fitting Height measurements.

There is a risk of parallax if the ECP is not at exactly the same height as the wearer when taking measurements.

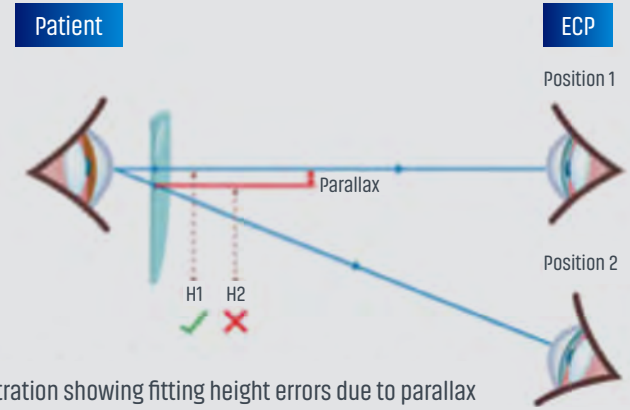


Illustration showing fitting height errors due to parallax

Digital Measuring Devices

To get the full benefit of modern lens designs, it's necessary to go **beyond traditional measurements of PD and fitting heights**.

Digital measuring systems provide **more precise measurements** compared to manual measurement tools.

The rulers and pupilometers used in traditional measurements have a gradation of 0.5 mm whereas **digital measuring systems measure to the nearest 0.1mm.**

Contrary to manual methods, digital measurements are taken while the patient is wearing the frames, **reflecting the conditions under which they're used in everyday activities.**

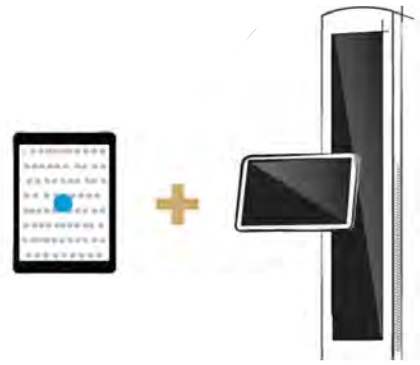
Taking measurements with a digital device is a lot more faster than manual methods.

Digital measuring systems offer a more interactive, **enlightening and comfortable measuring protocol** for patients and highlights the ECP's expertise.

Consumer tests demonstrate that digital measurements lead to high satisfaction rates

89%

of wearers think NVB has a strong impact on lens performance after experiencing both Visioffice® and NVB measurements in store [1]



(1) Varilux X Series with in-shop measurements – in-Life Consumer study – EUROSYN 3rd independent party - 2016 – France (N=136 participants)

Digital Measuring Devices - Eye Ruler™ 2

Principle

1 One picture is taken to determine PD and height.

2 Two pictures are taken, one directly in front and one with 20° of eccentricity, for improved PD and height measurement accuracy, and for the 3D position of the lens (tilt, wrap, vertex).

Far Vision Measurements
- Monocular Pupillary Distance
- Fitting Heights
- Vertex distance
- Pantoscopic Tilt
- Wrap angle

Near Vision Measurements
- Near Vision Behavior parameters
- Reading distance

Advice

Check if the device captures good corneal reflections

Boxing adjustments are essential for the accuracy of the measurements.

Digital Measuring Devices - Visioffice®

Essilor's Visioffice® is currently the only one in its category being able to measure **the real position of the optical** ERC in 3D referential [x,y,z]. The measurements are translated into Eyecode® data [PD,FH, ERCd].

It provides more accurate measurements of the basic parameters (PD, FH) in addition **to the most advanced personalization parameters.**

It is through the Visioffice® system that ECPs can dispense **the most premium individualized** Varilux® lenses available.

One single device to take all necessary measurements for personalized lenses.

H3D module to determine the **head cape** and the most **natural posture** of the wearer

Advice

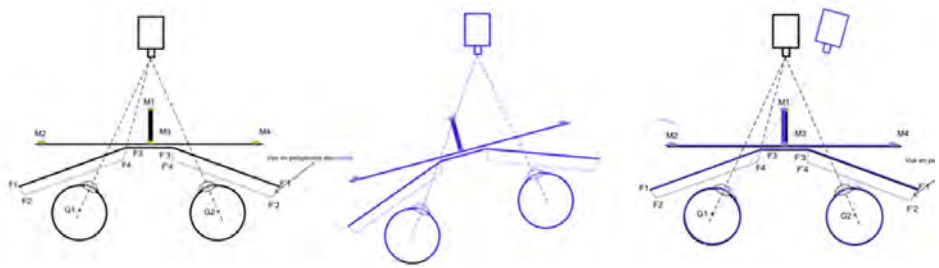
H3D must be systematic
Boxing adjustments are critical
for the accuracy of all measurements.

Digital Measuring Devices - Visioffice®

Principle

Two videos are taken:
Two images with an eccentricity of approximately 20° boxing are done in the two views

The software generates a 3D representation of the boxing and with the corneal reflex is able to localize the ERC.



- Exclusive eyecode® measurements
- H3D (Analysis of the consumer's natural posture) to optimize the centration
- ERC (Eye Rotation Center)
- Dominant eye
- Reading distance
- NVB (Near Vision Behavior)

Personalized FIT measurements

- PDs
- Fitting heights
- Pantoscopic angle
- ELD (Eye-Lens Distance)/vertex
- Wrap angle
- Head cape

Process to validate the measurement

Whatever the methodology chosen for the measurement, mark the fitting cross on the demo lens and check on the wearer if they match with the corneal reflections.

Keeping in mind the precision level difference between the traditional manual tools and the digital measuring tools, this step is mainly to make sure there is no major error.

Don't forget to check and compare the centration with the wearer's previous equipment.

Recommending Varilux® lenses

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The Varilux® revolution

In 1959, Bernard Maitenaz, a young engineer who joined SL in 1948, developed and patented a revolutionary solution to bifocals: The Varilux® lens.

This development came to transform the lives of presbyopes and gave rise to the entire optics sector.

2e ADDITION
AU BREVET D'INVENTION
N° 1.095.375
Gr. 12. — Cl. 2.
N° 67.669
Systèmes optiques à puissance localement variable.

Bernard Maitenaz proposed his invention to the société des lunetiers who registered the very first progressive Varilux® lens patent in 1953.

The introduction of Varilux® lenses in 1959, followed by Varilux® 2 lenses in 1972, allowed Varilux® to become the number one progressive lens brand worldwide*.

* Most sold progressive lens brand worldwide, according to market calculations.

Varilux® research & development

Varilux® leads the way with more than 70 patents* in cutting-edge progressive lens technology, the result of more than 60 years of research and innovation.

Working with independent eye care professionals to ensure lens superiority for our patients is key to Varilux® excellence.

Varilux® has pushed the boundaries of innovation, resulting in a total of 70 patents(*).

As part of Essilor® that have more than 500 researchers worldwide, **Varilux® is today the leading reference in progressive lenses at the forefront of research and development.**

UP TO **30 PATENTS** IN 1 Varilux® LENS

Varies per Varilux® lens type. Up to 30 inventions led to patent filings

(allowance/in-force status varies over time and depending on the country).

(*) 70 inventions led to patent filings in multiple countries since 1953 (allowance/in-force status varies over time and depending on the country).

Varilux® research & development

Focusing on the wearer

Since the very first progressive lens was developed, **the wearer has been the central focus in the technological development of Varilux® lenses.**

- Each new surface is tested by an independent party, according to a scientifically validated test
- Each subject indicates, during their evaluation, their level of satisfaction while wearing the lens.

This rigorous testing ensures that no Varilux® lens leaves the production line without being tested by **hundreds or thousands of wearers.**

EVALUATED BY
12,000 PEOPLE
Varilux®

LiveOptics™

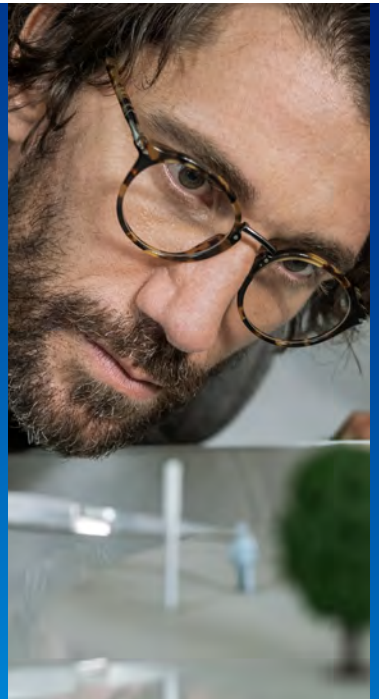
LiveOptics™, the innovation process, inspired by and for the life of your wearers.

Inspired by wearers' lives

Essilor® works together with patients or wearers to examine their vision & habits and to test our products in their lifestyle situation

Created with advanced technologies

Researcher's collect physiological biometrical and behavioural data to be compliant with the visual and postural needs of each person



Tested and validated by wearers

Wearer tests are conducted to ensure that the performance of the lenses are well perceived by wearers and their needs.

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Essilor's R&D Avatar

A new replication model of the wearer's visual experience:

Avatar : Breakthrough in the way we think about lens design evaluation.

- Binocularity
- Postural comfort
- 3D model
- Dynamic movements

Varilux® pushes the boundaries of science by **simulating the wearer's visual experience.**

Avatar is a model of understanding the lenses performances. It is unique and exclusive to Essilor's R&D department. This innovative tool is used to assess the performance of our lenses by reproducing the wearer's visual experience as closely as possible.

The computation builds on the wearer's binocularity, posture, 3D environment and eyes head movements. These characteristics generate an algorithm capable of simulating the wearer's visual system in a dynamic situation.

Then, the avatar is able to provide information regarding various performance criteria. These performance criteria can be: postural flexibility, reduction of the swim effect or even visual acuity.

Varilux®, a trustmark

Since the very first progressive lens, the wearer became the focus of the technological developments of Varilux® lenses.

#1 BRAND RECOMMENDED BY EYE CARE PROFESSIONALS*
Varilux® PROGRESSIVE LENSES

Each new surface is tested by an independent party, according to a scientifically validated test.

☆ HAPPY WEARERS
96% OF WEARERS ARE SATISFIED WITH THE QUALITY OF VISION THEIR Varilux® LENSES GIVE THEM

Each subject indicates, through their appreciation, their level of satisfaction while wearing the lens.

This rigorous testing has ensured that no Varilux® lens has left production without having been tested by several hundreds or thousands of wearers.

Varilux® SINCE 1959

#1 PROGRESSIVE LENS BRAND WORLDWIDE**

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* Euromonitor, 2020 data; Retail value amongst spectacle lenses category, brands representing progressive lenses.
**Survey conducted by CSA among a representative sample of 1041 independent ECPs, in 10 countries: Fr, Sp, Ger, It, UK, US, Canada, Brazil, India, China. Feb-Apr 2018

Varilux® Discovery

Varilux® Discovery allows patients to perceive the benefits of progressive lenses by comparing Varilux® Comfort Max lenses to single vision lenses and try before buying.

Today, young presbyopes main reluctance towards Progressive Lenses stem from:

- Not really knowing what progressive lenses are[1]
- Fear of not getting used to them[2]
- Not being able to try before buying[3].

Before proceeding to the lens choice, consider introducing Varilux® Discovery to your patient as a hands-on progressive lens demonstration.

Clips in the box

3 single vision lenses:

- +1.00
- +1.50
- +2.00

3 Varilux® Comfort Max lenses:

- Plano Add +1.00
- Plano Add +1.50
- Plano Add +2.00

For whom?

- Young presbyopes who are still hesitant
- Ametropic or emmetropic patients.

Advantages

- A technical/pro feel: adjustable fittings (PD and Height)
- Easy and quick to use: right and left lenses attach and with the same addition
- Convenient: magnetic clips for quick comparison.

Varilux® Discovery demonstration tool has a technical, futuristic design which modernizes progressive lenses demonstrations and makes it more engaging.

1.Study conducted by an independent 3rd party, 2018, among 8641 consumers (including: 2400 midlifers & 840 seniors) in France, USA, China.2. Study conducted by an independent 3rd party, 2018 & 2019, among 10947 wearers & non wearers, 40-65 yo, in France, USA, Brazil, China, India 3. Study conducted by an independent 3rd party, 2018, among 4462 presbyopes, 40-65 yo, in France, USA, Brazil, China.

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Lens choice - Varilux® product range

	Varilux® Liberty™ 3.0	Varilux® Comfort Max	Varilux® Physio® 3.0	Varilux® E series™	Varilux® X series™
Consumers	Looking for a branded all-in-one solution at an entry-level price	Busy lifestyle looking for comfort, a safe choice, good value for money	Active, always on the move, dynamic lifestyle looking for performance	Consumers seeking high technology products while managing their financial investment	Multitaskers and technology lovers looking for the most advanced performance with no compromise
Solutions	All in one harmonious vision	All-day long vision comfort	Effortless vision for intense living	Steady vision in motion	Seamlessly capture every detail within arm's reach.
Technologies	Path Optimizer™	Flex Optim™ W.A.V.E 2.0™	Binocular Booster™ W.A.V.E 2.0™	Swim Control[1] W.A.V.E 2.0™	W.A.V.E 2.0™ Nanoptix® Synchroneyes® Xtend™

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Varilux® Liberty™ 3.0

All-in-one harmonious vision

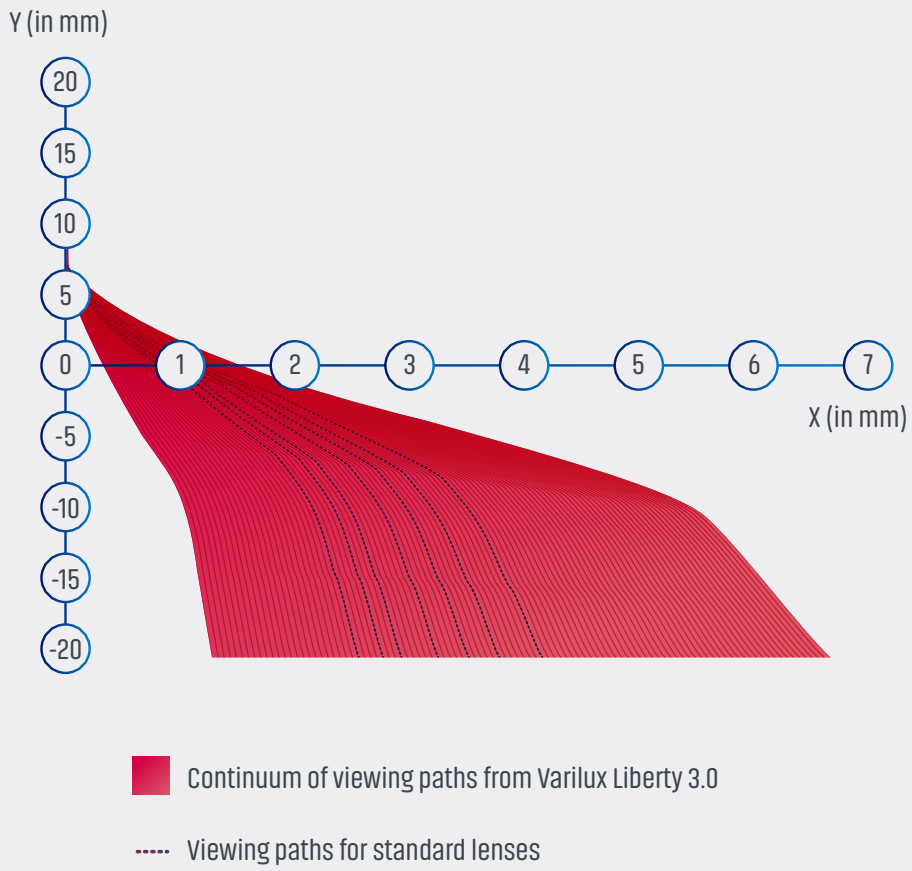
Path Optimizer™

A continuum of viewing paths resulting from 40 million parameter combinations

Easy focus and uniform sharp vision at all distances with smooth transitions in-between.

An all-in-one lens for wearers who want to live the Varilux experience at an affordable price.

The PATH OPTIMIZER Technology will generate a precise and optimal viewing path, from far to near and everything in between, so that each and every part of the viewing path matches wearer's eyesight.



Source: Simulations from R&D

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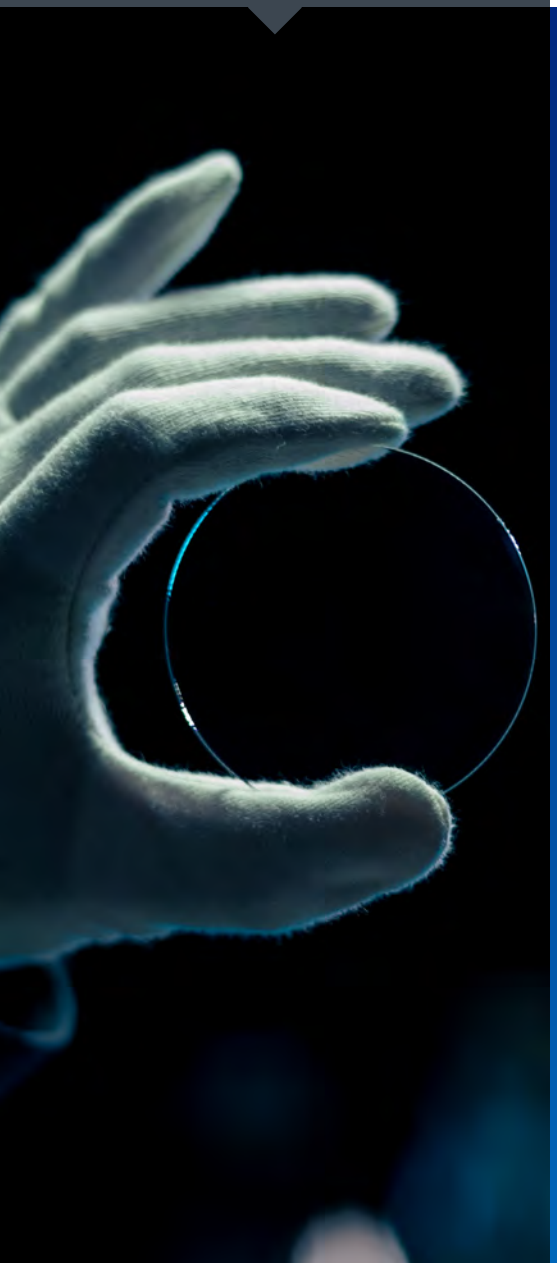
Varilux® Liberty™ 3.0

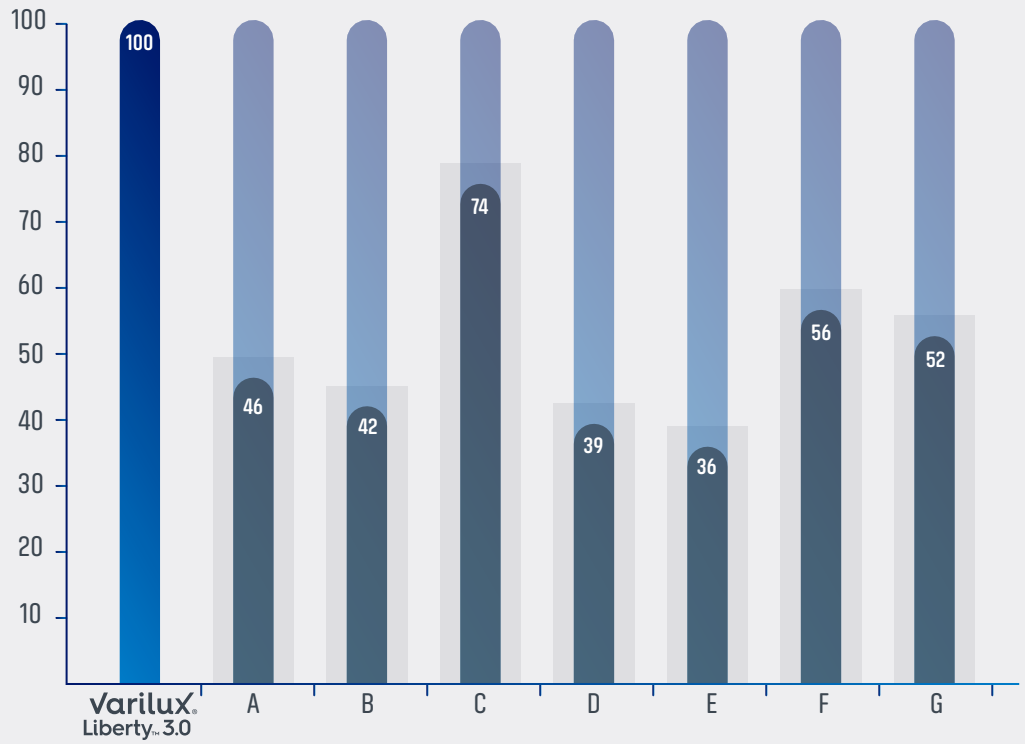
All-in-one harmonious vision



Benefits

With Path Optimizer lens technology, the wearer can enjoy uniform sharpness and smooth transitions between different distances.

Sharpness index along wearer visual path*



Sharpness index > Competitors'

*Source: R&D analysis. R&D has affected a reference value of 100 for Varilux Liberty 3.0 within its competitive environment

ESSILOR Varilux

Varilux® Comfort Max

All-day-long
Vision comfort

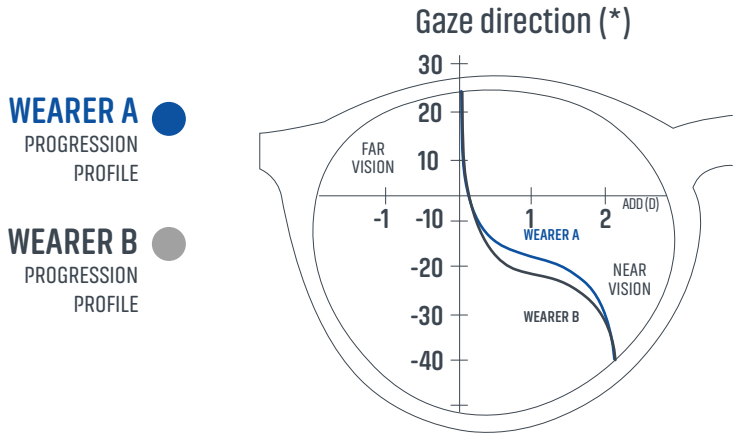
Varilux® Comfort Max is the latest generation of ergonomic progressive lenses for all-day-long vision comfort. It has been developed to increase the wearer's postural flexibility for sharp vision at distances and maximized comfort throughout the day.

Ideal for current and new PAL wearers, looking for all-day-long visual comfort, all-around performance, safe choice and good value for money.

Today's complex and increasingly digital environment may lead to discomfort and postural constraints, especially for PAL wearers. To keep up, they need more flexibility.

Flex Optim technology has been developed to provide good all-around visual performance.

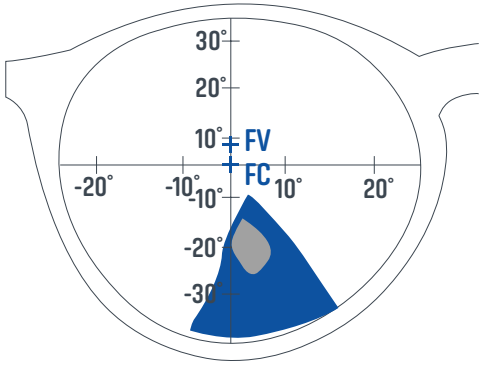
Flex Optim™ W.A.V.E 2.0™



1 It adjusts the power progression profile to each individual to achieve an equilibrium across vision zones.

STRETCHED USEFUL VISION ZONE
+46% (1)

Flex Optim™



2 This results in a stretched useful vision zone: the range of gaze directions that allows the wearer to see sharply a given point is maximized, for more visual comfort.

(1) vs. Varilux® Comfort 3.0 lens. Average percentage gain in area considering 3 prescriptions (-4 Add 2, 0 Add 2 & +4 Add 2), 5 target distances (at 40cm, 60cm, 1m, 2m & 5m) and max visual acuity loss of 0.15 logMAR.

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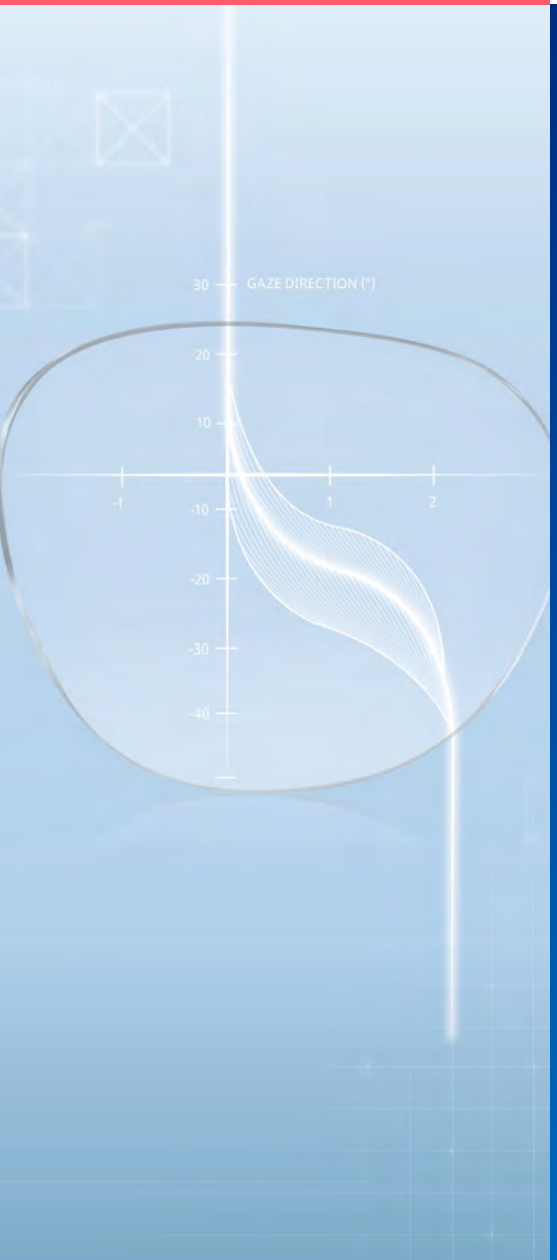
Varilux® Comfort Max

All-day-long
Vision comfort



Benefits

1. Maximized postural flexibility to see sharply at all distances, all-day-long
2. Longer lasting vision check formatting comfort throughout the day
3. Instant focus
4. Smooth transitions and easy adaptation
5. Good all-around performance.

High level of satisfaction

Among new PAL wearers

9/10
want to continue wearing it![1][3]

83%
got used to it without even thinking about it! [1][4]

And experienced PAL wearers (wearing competition PALs)

97%
Got used to it within 2 days[2][5]

80%
Prefer it to their usual lenses [2][6]

96%
Would recommend it [2][3]

(1) Source : Varilux® Comfort Max : in-Life & in-Key situations consumer study – EURO SYN – FRANCE – 2019 (n=53 new PAL wearers)
(2) Source : Varilux® Comfort Max : in-Life & in-Key situations consumer study – EURO SYN – FRANCE – 2020 (n=84 PAL wearers)
(3) Wearers who answered 'Yes' on a Yes / No scale
(4) Wearers who answered 'Somewhat agree ' or 'Completely agree' - 4-point agreement scale
(5) Wearers chose among: 'Immediately', 'Minutes only', 'Hours only', '1 or 2 days', '3 to 5 days', 'more than 5 days', 'I am still not used to them'
(6) Wearers evaluated their preference on a 5 point scale from 'I prefer a lot my previous eyeglasses' to 'I prefer a lot the study eyeglasses' - % of 'I prefer slightly the study eyeglasses' & 'I prefer a lot the study eyeglasses' - N=49/84 PAL wearers of direct competitors designs.

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Varilux® Physio® 3.0

Effortless vision for intense living

Seamless transitions from near to far and far to near, for maximized performance even when life is accelerating.

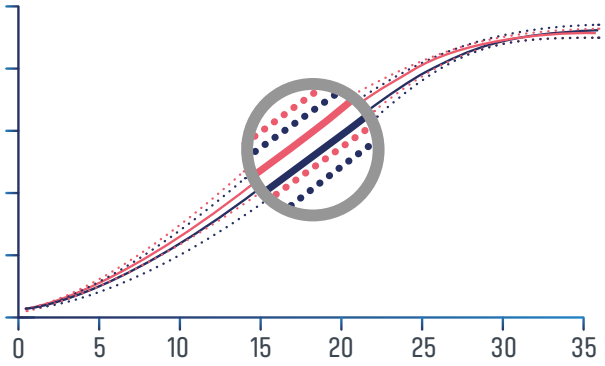
Binocular Booster™

Binocular Booster™, a bespoke optimizer for wearers' vision to enjoy the richness of the world.

For wearers who are always on the move and who seek performance at anytime during the day.

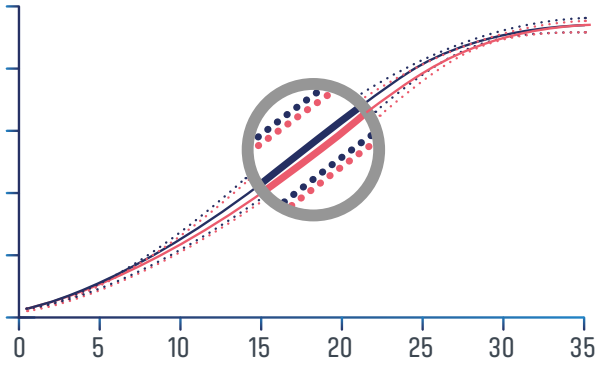
W.A.V.E 2.0™

Binocular Booster™ uses the prescription of both eyes to compute the meridian lines binocularly, allowing the eyes to work better together while switching from one vision zone to another and providing unequalled binocular visual acuity*.



Left eye

Right eye



Without Binocular Booster™

Slight binocular imbalance

With Binocular Booster™

Effortless vision because transitions are perfectly smooth between near and far at any point.

Source: Simulations from R&D
*Internal Essilor R&D's Avatar simulations 2020

ESSILOR Varilux®

Varilux® Physio® 3.0

Effortless vision for intense living

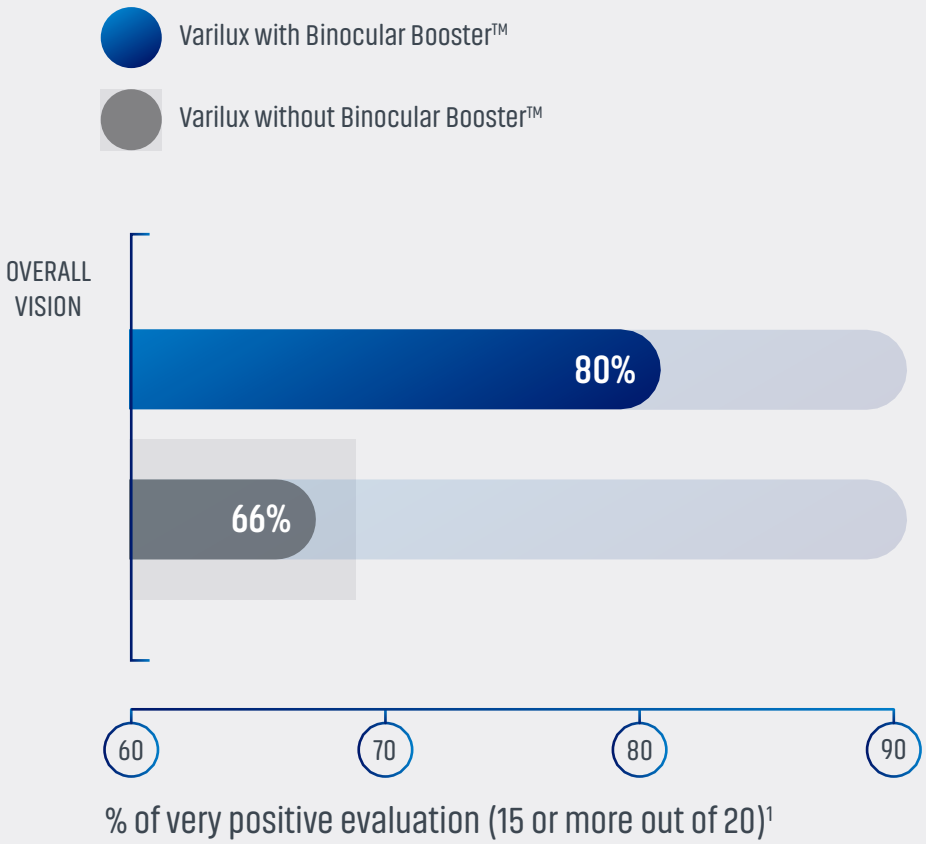
Varilux® Physio™ 3.0 provides

1. Effortless vision, even on the move
2. Seamless transitions from near to far and far to near
3. Unequalled binocular visual acuity*
4. High resolution vision even in low light.

*Internal Essilor R&D's Avatar simulations 2020

Evaluation of overall vision performance by wearers of Varilux® Physio™ 3.0

(with Binocular Booster™)



1. Source: Comparative in-Life Wearers
Test conducted by 3rd independent parties (n=83 wearers)

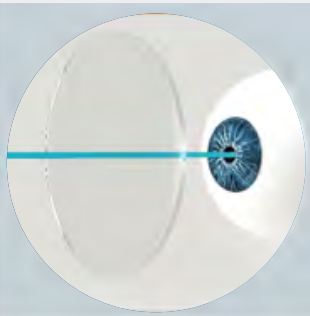
ESSILOR Varilux

W.A.V.E 2.0™

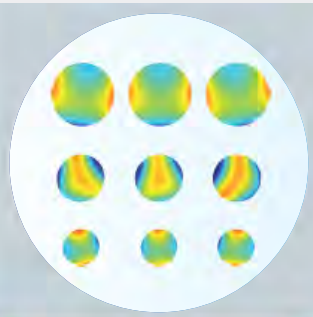
The WAVE technology manages the aberrations of the lens, by controlling the wavefront entering the eye

Wave 2.0™ aims to correct the lens' high order aberrations (HOA), which occur especially when the pupil diameter is large, i.e. in low light conditions. It takes into account the pupil size, which depends on the wearer's age, the object distance and the light conditions.

Without WAVE 2.0™



Only the ray passing through the center of the pupil is considered. This theoretical model does not correct for higher order aberrations.

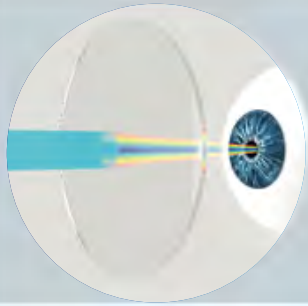


Pupil Diameter

Far: 8 mm
Intermediate: 7mm
Near: 6mm

Aberration level:
Exemple: -4.00 Add 2.00

With WAVE 2.0™



The entire beam entering the pupil is analyzed.

Pupil Diameter

Far: 8 mm
Intermediate: 7mm
Near: 6mm

The **W.A.V.E. 2.0™ Technology** thus reduces the deformations of the wavefront (linked to how the beam crosses the lens) that penetrate the pupil in order to minimize aberrations.

Better image quality and 30% more contrast for precise view of details.

The size of the pupil is essential to determining the size of the beam entering the eye. Pupil diameter varies with age, ametropia, viewing distance and light. Taking into account the pupillary diameter at each point of the lens and for each prescription makes it possible to further minimize aberrations.

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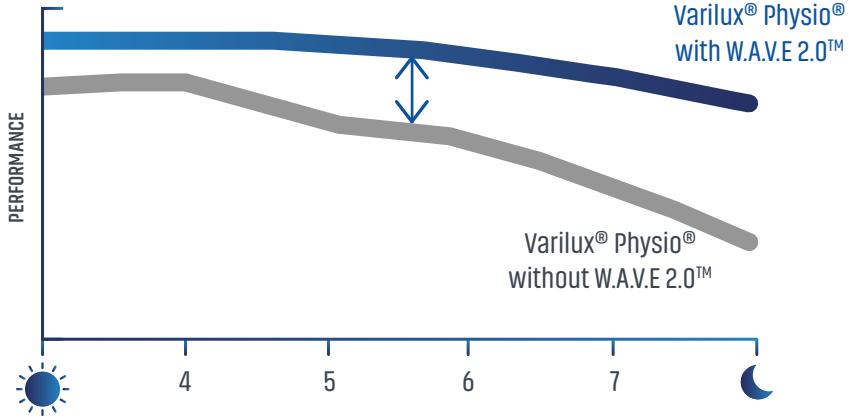
W.A.V.E 2.0™

Wave 2.0™ minimizes Higher Order Aberrations within the pupil, offering high resolution vision whatever the light conditions.



High resolution Vision whatever the light conditions is verified for 60% of wearers.

Lens preference under dim and standard light conditions

	Varilux® Physio® with W.A.V.E 2.0™	Varilux® Physio® without W.A.V.E 2.0™	No Preference
Standard ligth	**50%**	20%	30%
Dim ligth	**60%**	13%	27%

In lab Comparative Testing (3rd independent party, 2010): % preference of the lenses while doing different tasks and for standard and dim ligh conditions.

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Varilux® E series™

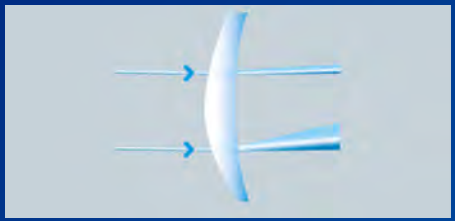
Steady vision in motion

Fast adaptation and less distortion for enhanced vision and true images

Wearer benefits:

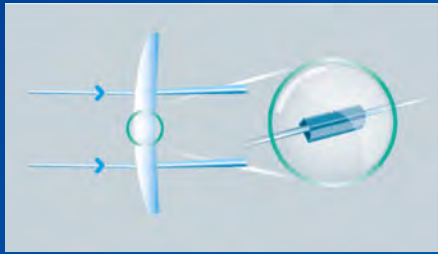
1. Easy vision for all presbyopes
2. Vision stability with Swim Control™ by reducing off-balance effect (up to 50% less swim effect[1]).
3. No adaptation effort.

Traditional design without micro-elements



The lens is calculated as a whole: when the lens addition increases, the lens curvature increases as well and so the swim effect.

Micro-element structure With swim control

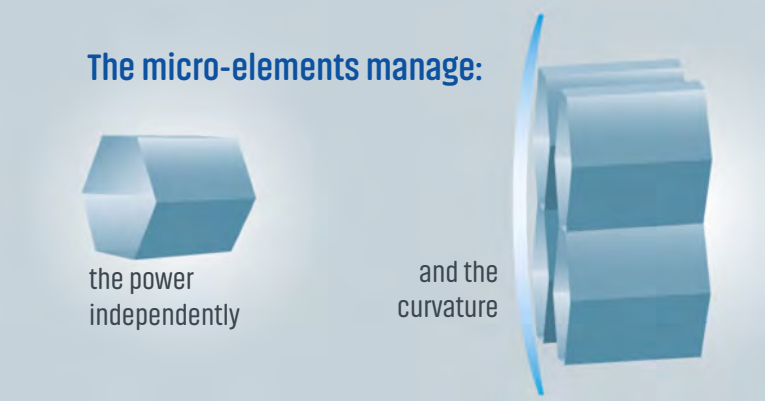


Micro elements are used to manage the lens addition independently from the lens curvature: although the lens addition increases, we control the lens geometry so the swim effect is dramatically reduced.

Swim Control™

Following the Nanoptix® Technology, Swim Control™ is derived from a multi-patented calculation based on micro-elements.

The decomposition of the glass structure into micro-elements makes it possible to independently manage the power and the curvature of the glass.



1. Swim Control™ reduces the swim Effect up to 50%
Nanoptix® reduces the swim Effect up to 90%

ESSILOR Varilux

Varilux® X series™

Extended vision within arm's reach

Varilux® X series™ lens reinvents near vision, offering extended vision at arm's length so that wearers can seamlessly capture every detail within arm's reach*, and beyond. No need to hunt for the sweet spot.
Near Vision Behavior: a 4-IN-1 measure combining postural and visual behavior in near vision.

* Vision within arm's reach, corresponding to distances between 40 and 70 cm. vs. other Varilux lenses
** Internal Essilor R&D's Avatar simulations 2020

Xtend™

Xtend™ technology is a revolution in lens conception. It exclusively reshapes each wearer's arm's length vision zone, allowing them to manage multiple targets within the same gaze direction: it is a gain of volume of vision within arm's length.

Synchroneyes®

Synchroneyes® technology takes into account the prescription of both eyes, the physiological and fitting parameters to make sure the two lenses have the same optical performance in a binocular environment. It ensures expanded fields of vision for wearers.

Nanoptix®

Nanoptix®a technology is a dynamic distortion absorber, providing ultimate stabilized vision** to the wearer. It improves vision in motion, either when the wearer themselves moves, or when something moves within their surroundings.

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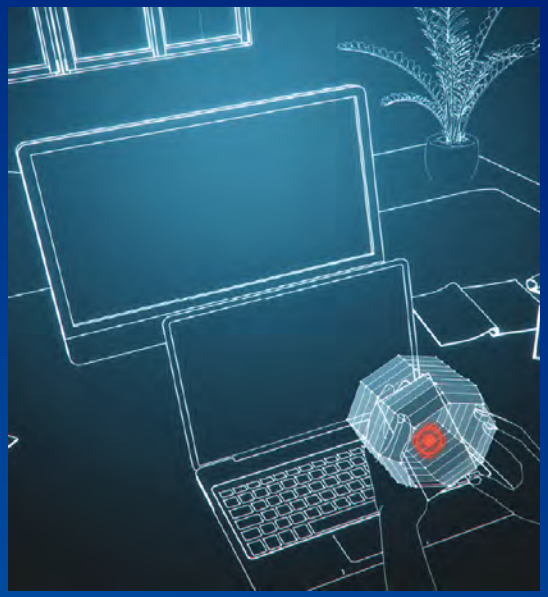
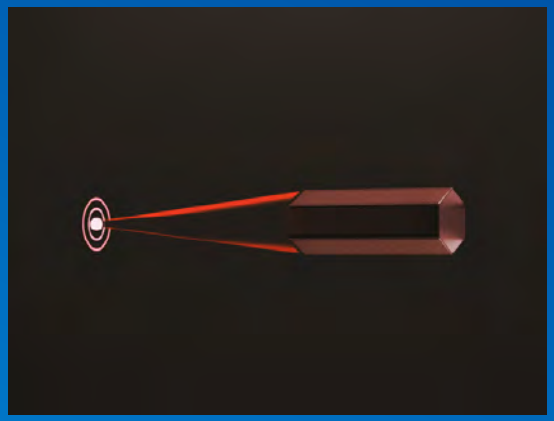
Xtend™

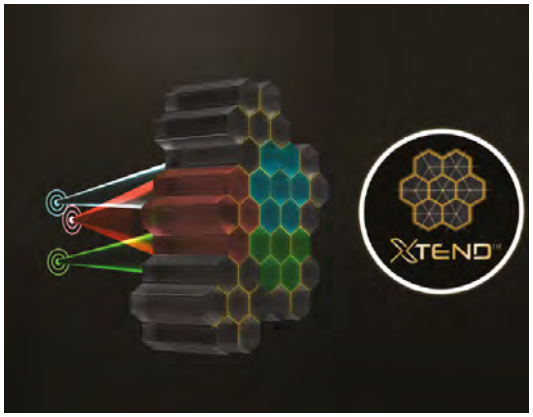
Xtend™ technology manages multiple targets for the same gaze direction.



- Until now, each Nanoptix® element was optimized to manage one target object for one gaze direction and eliminate swim effect.
- Nanoptix® elements were managed one by one.



- New Xtend™ technology optimization improves visual performance and delivers extended vision within arm's reach, allowing wearers to see MULTIPLE TARGETS FOR A SINGLE GAZE DIRECTION.
- Nanoptix® elements are managed by CLUSTERS OF 7 in order to combine their power and multiply their effects.



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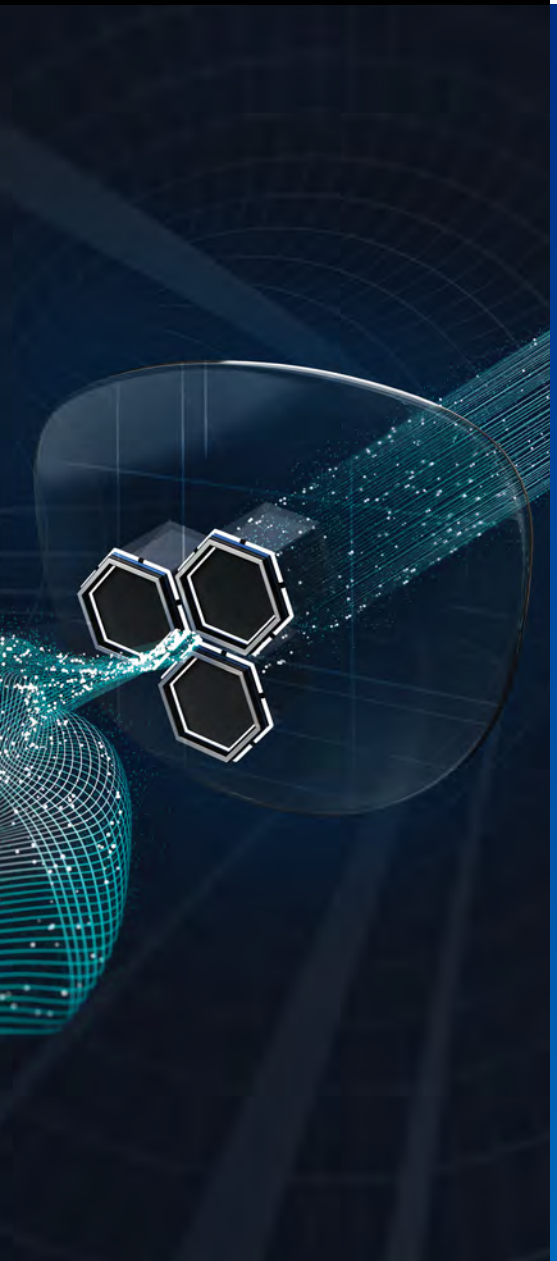
Varilux

Varilux® X series™

Extended vision within arm's reach



Benefits

1. Extended vision within arm's reach* and beyond
2. Maximized volume of vision and fields of vision
3. Ultimate stabilized vision
4. Accelerated fluidity and adaptation with NVB measure.

Stunning wearer tests results

Up to

91%

of wearers with good visual quality at all distances[1]

86%

preference while multitasking at arm's length[2]

vs. Varilux S Series

9/10

Wearers no longer feel the need to make additional head movements to see clearly[3]

(1) International multicenter study (n=66). Vision quality was evaluated on: Overall Vision, Distance vision, Intermediate Vision, Near Vision, Dynamic Vision. For overall and dynamic vision, wearers rated on a 10-point scale from 'Not clear at all' to 'Very clear'. Good visual quality is from 7 to 10. For distance, intermediate and near vision, wearers rated on the same scale and on a 10-point scale from 'Very narrow' to 'Very wide'. Good visual quality is when average of clarity and width is from 7 to 10.

(2) Single-center study - Eurosyn - France (n=42). Among wearers who made a choice (n=28/42).
(3) Eurosyn - France (n = 42). Percentage of wearers who did not need to move their heads or just a little to see clearly. Wearers rated this criterion among the following scale: «not at all», «a little», «too much», «a lot too much".
* Vision within arm's reach, corresponding to distances between 40 and 70 cm. vs. other Varilux lenses.

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Varilux® Digitime®

Whether they are a young presbyope or established presbyope, people place great demands on their near and intermediate vision during their indoor activities. Modern lifestyles are active, interconnected and require frequent multitasking.

- More than 90% of 45-to-65-year-olds use one digital device daily for leisure or for work*
- 6 out of 10 spend more than 4 hours in front of a screen*.

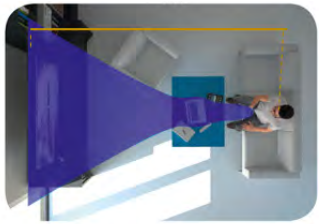
*Consumer quantitative study conducted in 2014 among 4000 individuals in France, Brazil, China and the US by Ipsos for Essilor

Varilux® Digitime® offers adapted solutions to these problems:

Varilux® Digitime® near 80cm

Varilux® Digitime® mid 100cm

Varilux® Digitime® room 220cm



Digital tools demand even more effort:

7/10
suffer from tired eyes

6/10
small characters

70%
complain about neck and shoulder pain

Varilux Digitime is the perfect indoor solution answering their needs.
It should be recommended in the following cases:

- **As a second pair** for Varilux® lens wearers spending a lot of time time indoors to get larger fields of view and a better ergonomy in their tasks.
- **As a first pair** for presbyopic emmetropes who don't want to invest in a pair of Varilux® lens.

Dedicated to indoor and digital activities, Varilux® Digitime® is recommended with Blue UV Filter System and/or Crizal® to protect the eye against the effects of the potential harmful blue-violet light emitted by screens.

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Varilux® Digitime®

A response to issues related to screens: ultra-near vision zone

Benefits

1. Relaxed eyes even during prolonged use of smartphones
2. Improved readability of small characters
3. Natural posture when using a device and interacting with others

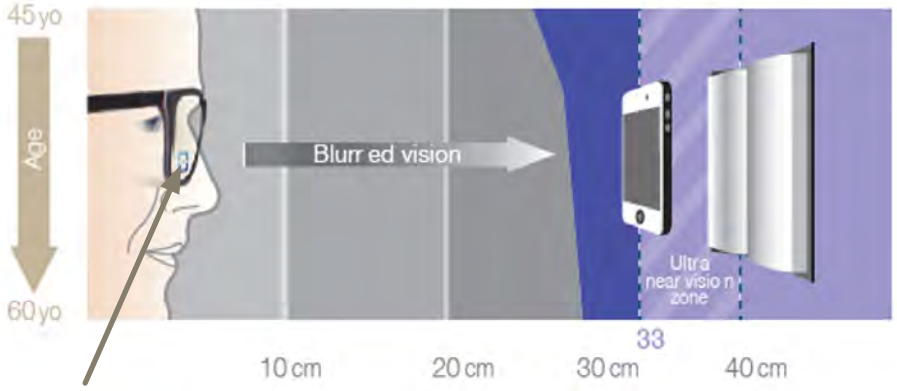
An Ultra Near Vision zone with an extra power in the very lower part of the lens to fit the natural posture of the wearers and to relieve their eye fatigue while interacting with smartphones.

Depending on the design; Near, Mid or Room, the value of the extra power is different:

Up to 0.5D for Varilux Digitime Near

Up to 0.25D for Varilux Digitime Mid

Up to 0.125D for Varilux Digitime Room



Additional power in ultra near vision zone of Varilux Digitime lenses below near vision

Comfortable accommodation

Uncomfortable accommodation

89% of wearers consider having good visual comfort when using their Smartphone*

81% of wearers have less difficulty when reading small characters on their Smartphone**

* From 7 to 10/10, ** « significantly better » and « better » Internal sanity check (N=36)

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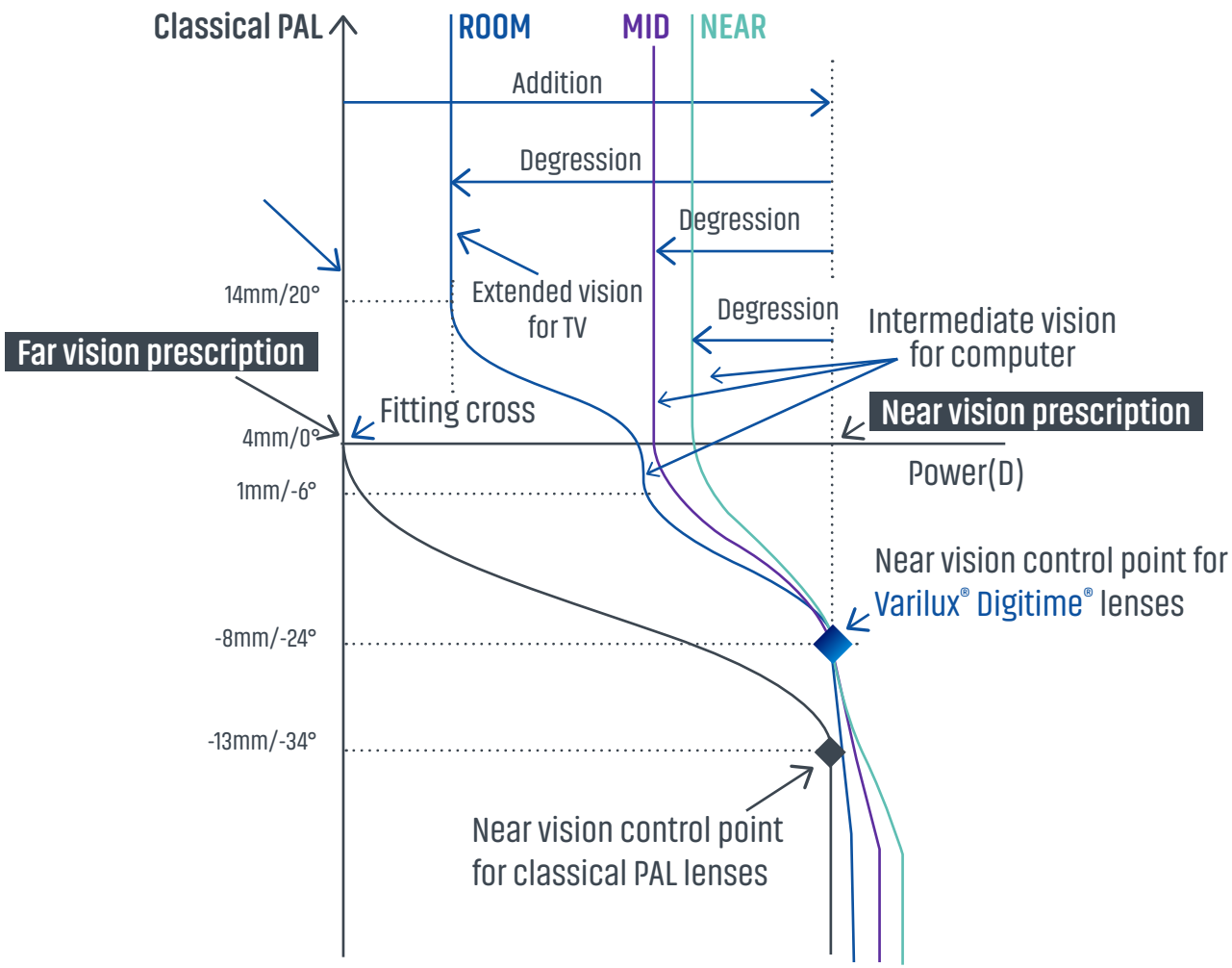
Varilux® Digitime®

Illustration of the designs' specificities of the optical power of Varilux® Digitime® Near, Mid and Room along the meridian line



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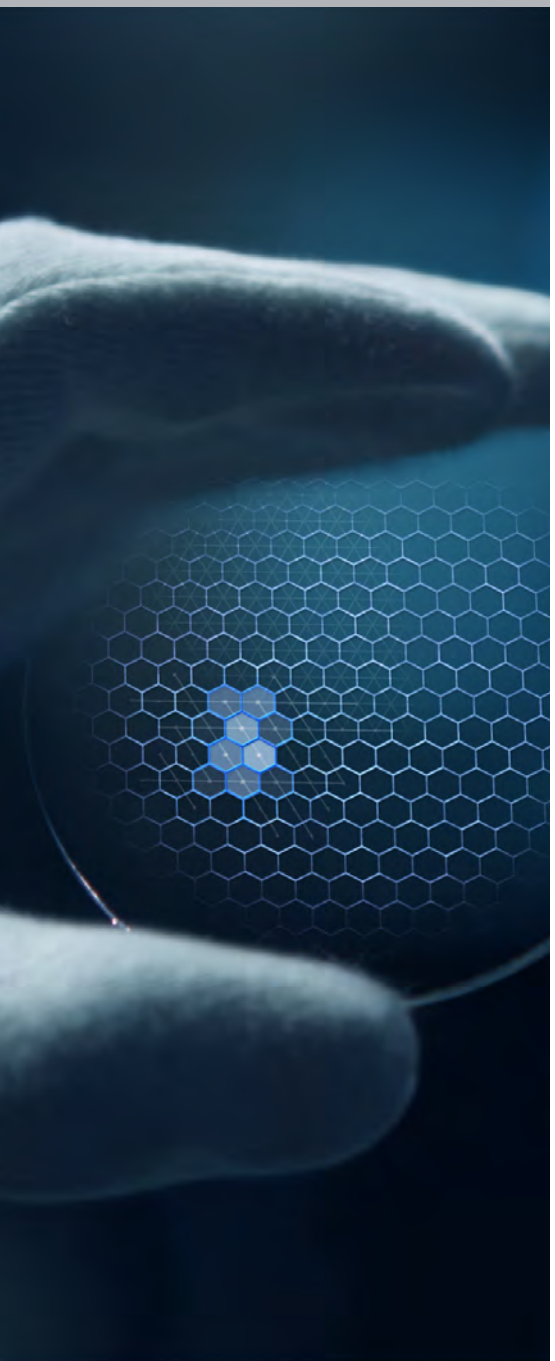
Varilux® Digitime®



The degression values necessary for the depths of field

	Varilux® Digitime® near 80cm		Varilux® Digitime® mid 100cm		Varilux® Digitime® room 220cm	
Additions (D)	Degression (D)	Depths of fields (cm)	Degression (D)	Depths of fields (cm)	Degression (D)	Depths of fields (cm)
0,75	0,55	500	0,80		1,00	
1,00		222		500		
1,25	1,00	400	1,25		1,50	
1,50		200		400		
1,75	1,30	222	1,55	500	1,75	400
2,00		143		222		
2,25		105		143	2,10	667
2,50		83		105		250
2,75		69		83		154
3,00		59		69		111
3,25		51		59		87
3,50		45		51		71

ESSILOR Varilux®

Varilux® technologies

		Varilux® Classics			Series	
		Liberty 3.0	Comfort Max	Physio 3.0	E series	X series
Technology	**Benefits of the technology**	**Technology availability**				
Xtend™	Maximized volume of vision within arm's reach					✓
Nanoptix®	Dynamic distortion absorber					✓
Synchroneyes®	Expanded fields of vision					✓
SwimControl™	Reduced swim effect				✓	
Binocular Booster™	Binocular performance improvement objective: same aberration level along meridian line			✓		
Flex Optim™	Improved postural flexibility: a stretched useful vision zone and a broader range of head movements		✓			
W.A.V.E 2.0™	Improved sharp vision even in low light conditions		✓	✓	✓	✓
Path Optimizer™ Technology	Improved transitions between zone (Right meridian location + few aberrations on it)	✓	✓	✓	✓	✓

ESSILOR Varilux

Combine Varilux® lenses with Crizal® to shield eyes and lenses from visible and invisible aggressions that can hinder vision comfort.

Crizal®

Provides
a superior transparency

Extends
the durability of the lenses

Offers
a superior ease of cleaning

Protects
the eyes from
the dangers of UV rays

All Crizal® technologies are designed to protect wearers against the enemies of clear vision.

Reflections

Scratches

Smudges

Dust

Water

UV

Crizal® unique expertise has been acknowledged since 1992.

The leading anti-reflective lens brand in consumer contentment[1]

Up to 10 patents for Crizal® coating range[2]

Performance assessed by multiple technical & real life wear tests

With Crizal®, unlock a feeling of carefreeness.

(1) Higher number of current Crizal users who declared to be "completely satisfied" compared to the average of competitors. Data is based on a 3-year average (Brand Tracking – MSW - 2019 - 11 countries - 12746 respondents).
(2) (2) Up to 10 inventions led to patent filings (which allowance/in-force status varies over time and country. May vary per Crizal® coating product.)

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Combined with other Essilor technologies, Varilux® lenses may help preserve Eye Capital:

Eyes have precious limited reserves allowing visual and non-visual functions that we call Eye Capital, that could be negatively impacted by over exposure to UV and blue-violet light among other factors.

Light is vital, it can be selectively filtered with adapted lenses to help **preserve your patients' Eye Capital**, to ensure that light works in our favor rather than against us. Combine Varilux® with other technologies that helps to preserve your customer's Eye Capital :

Crizal® coatings offer the most comprehensive daily protection against the invisible, and often irreversible, dangers of UV reflection.

Blue UV Capture™ provides **Everyday Harmful Blue light & UV protection** in an optimal clear lens*.

*Harmful Blue light: up to 455nm with the greatest toxicity between 415-455nm. For Polycarbonate concave lenses, the harmful blue light blocking percentage might be slightly lower. Regular prescription lenses = 1.5 or Poly material (without blue protection) with Crizal Forte® UV coating at equal center-thickness.Extremely low residual tint resulting from absorbing blue-violet light.»

Ordering parameters

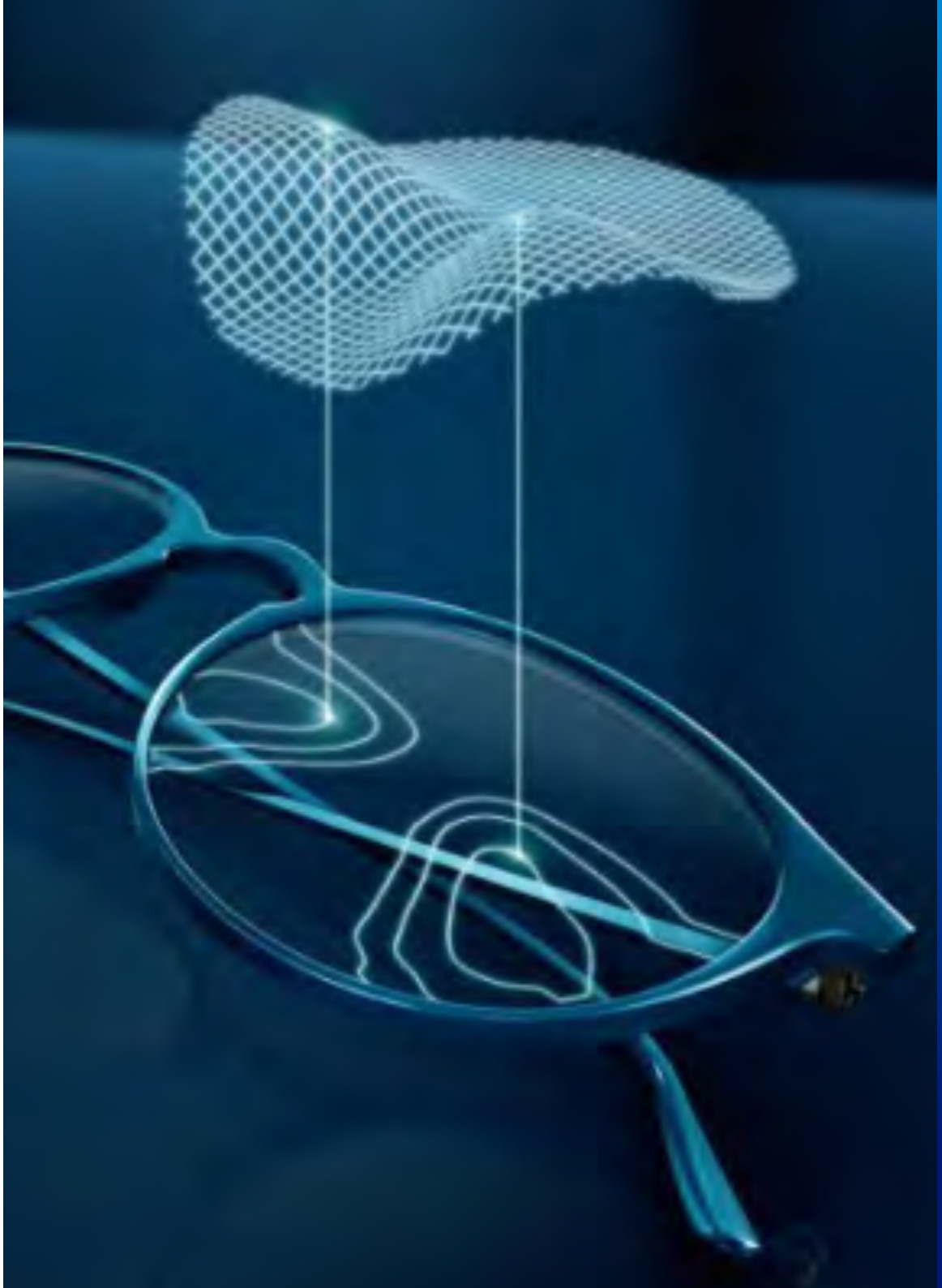
Ordering Parameters

		Varilux Classics			Varilux Series	
		Liberty 3.0	Comfort Max	Physio 3.0	E	X
Options	**Options benefits**					
AVA™	Prescription at 0.01D	✓	✓	✓	✓	✓
Forced Base	Adapt lens curve to an optician's choice (Aesthetics objective : thickness or base matching between frame and lens)	+1/-1	+1/-1	+1/-1	NA	NA
Progression Length Fixed value depending on product version	**Regular**	✓	✓	✓	✓	✓
	Short	✓	✓	✓	✓	✓
	Ultra Short	✓	✓	✓	NA	NA
FIT 3 kinds of personalization available through this option	1/ Progression Length : optimization of vertical position of near vision	✓	✓	✓	✓	✓
	2/Variable inset : optimization of horizontal position of near vision	✓	✓	✓	✓	✓
	3/Wearing conditions (pantoscopic tilt, vertex, wrap angle): Deliver optimal performance to the wearer whatever the position of the lens in front of the eye	FIT & non fit: default wrap 2°	FIT & non fit: default wrap 7°	FIT: default wrap 7° non FIT: default wrap 2°	FIT: default wrap 7° non FIT: default wrap 2°	FIT: default wrap 7° non FIT: default wrap 2°
Eyecode®	Deliver optimal performance to the wearer whatever the position of the lens in front of the eye	✓	✓	✓	✓	✓
NVB	Adjust progression profile to the wearer behaviour in near vision => impact inset , PL and progression profile					for Xtrack/Xclusive version only
Dominant Eye	Improve reaction time (target detection) => used to personalize Synchroneyes option					for 4D version only

Impact of data on Varilux® design

	Inset	Progression Length (PL)
Prescription	✓ optimized to Rx on Varilux	
Monocular PD Default value : 32 mm	✓ if given	
Reading distance Default value : 40 mm	✓ (if given only FIt on Varilux) should not be registered in case of NVB option	
FH _ No default value		✓ For Fit version only
Progression Length Regular : 17 mm Short : 14 mm UltraShort : 12mm	✓	✓ optician can specify PL for the FIT version PL should not be registered for the NVB
Eyecode : ERC lens distance Default value : 25.5mm	✓	✓
Fit; panto, vertex, wrap Default values : 8°, 12mm, 2 or 7°	✓ (vertex impact inset value)	✓ (vertex distance)
Dominant Eye No default value		
NVB No default value	✓	✓

Edging and Mounting



First check

1 Cosmetic check of the surfaces of the lens

2 Stamping and Micro-engraving

Check if they match correctly. If not, the reference is the micro-engraving

3 Check the power of the lens

- **Check the distance vision power** with a focimeter at the fitting cross
  In case of prism prescription: move to the prism reference point (PRP middle of the 2 micro-circles). The prism measured is the resultant of the thinning prism (2/3 of the addition) and a corrective prism, if any.
- **Check the near addition** with the micro-engraving

4

Some lens designs take complex optimization criteria into account (aspherization, customization, etc.) which impact the direct focimeter reading. These lenses are supplied with **double labelling**. (For more information, see the next page)

5

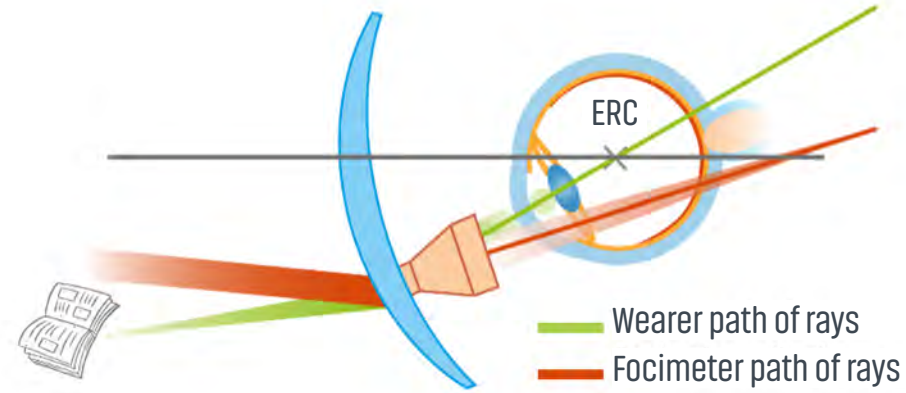
For Varilux® X series™, the exact position of the near vision is mentioned on the sticker with the 2 following values:

- Progression Length (PL)
- INS Inset

Double labelling: Wearer power vs focimeter

Trial lens	PAL
Simple surfaces	Complex/aspherical surface
Non-tilted lens	Tilted lens
Centered lens	Decentered lens

Power of the lens worn has to be different to the power of the lens prescribed to ensure an equivalent visual performance.



On the stickers indicating the power of the wearer,
there are always two pieces of information:
> 1st line is the wearer's prescription
> 2nd line is the measured power through a focimeter (IOA)

R/L	DD	Sph	Cyl	Axe	Add
👁	70/75	+3.25	+0.75	030	+1.25
		+3.12	+0.62	025	+1.14

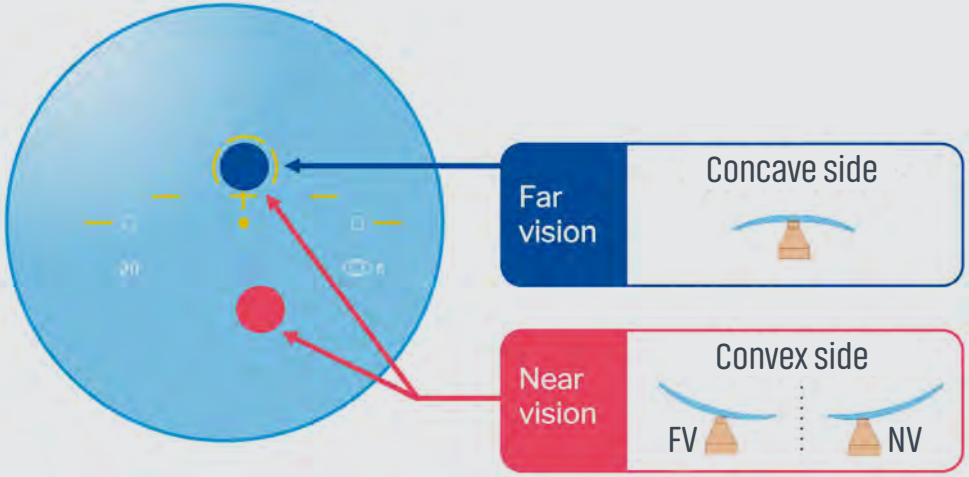
How to measure the lens with a focimeter?

- Measurement of the Far Vision in the concave position
- Measurement of the addition in 3 steps (lens: convex side)

1 Measurement of Far Vision

2 Measurement of Near Vision

3 The difference between Step 1 and Step 2 gives the addition



Note: Near Vision is not always located in the middle of the marking due to the inset.

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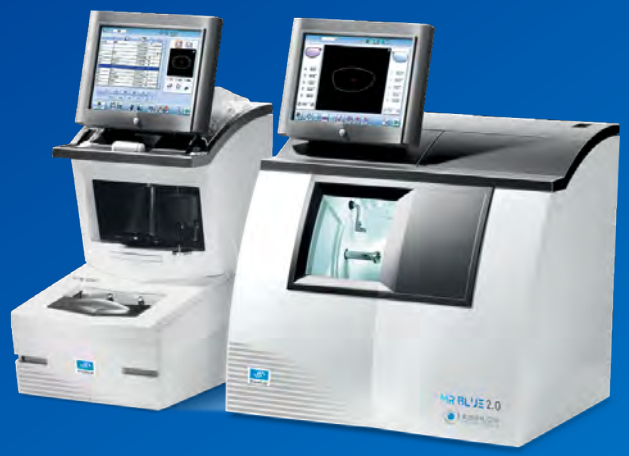
Edging & Mounting

Centering

In this step you will associate the design of the lens to the position in front of the patient's eye.

- Ensure you are working with the same reference system as the one used for fitting: Boxing / Datum
- Use the progresive lens target based on microengraving to center the lens.



Edging

Cutting cycles are specific to different types of lenses. Ensure you select the right parameter to avoid any damage to the lens that could affect the optical performance. Select the cycle according to the lens:

- Material: 1.5, PC, MHI
- Thin or coated lens prefer 2 Stars or milling cycle (Note: For your Varilux Lenses, Blue Azur Layer is systematic on Crizal coatings to improve the adherence with the PAD)

Mounting

Avoid stress on the lenses, ensure you select the correct size

- tensiscope to control the stress
- no heat to fit lenses in plastic frames

Final check

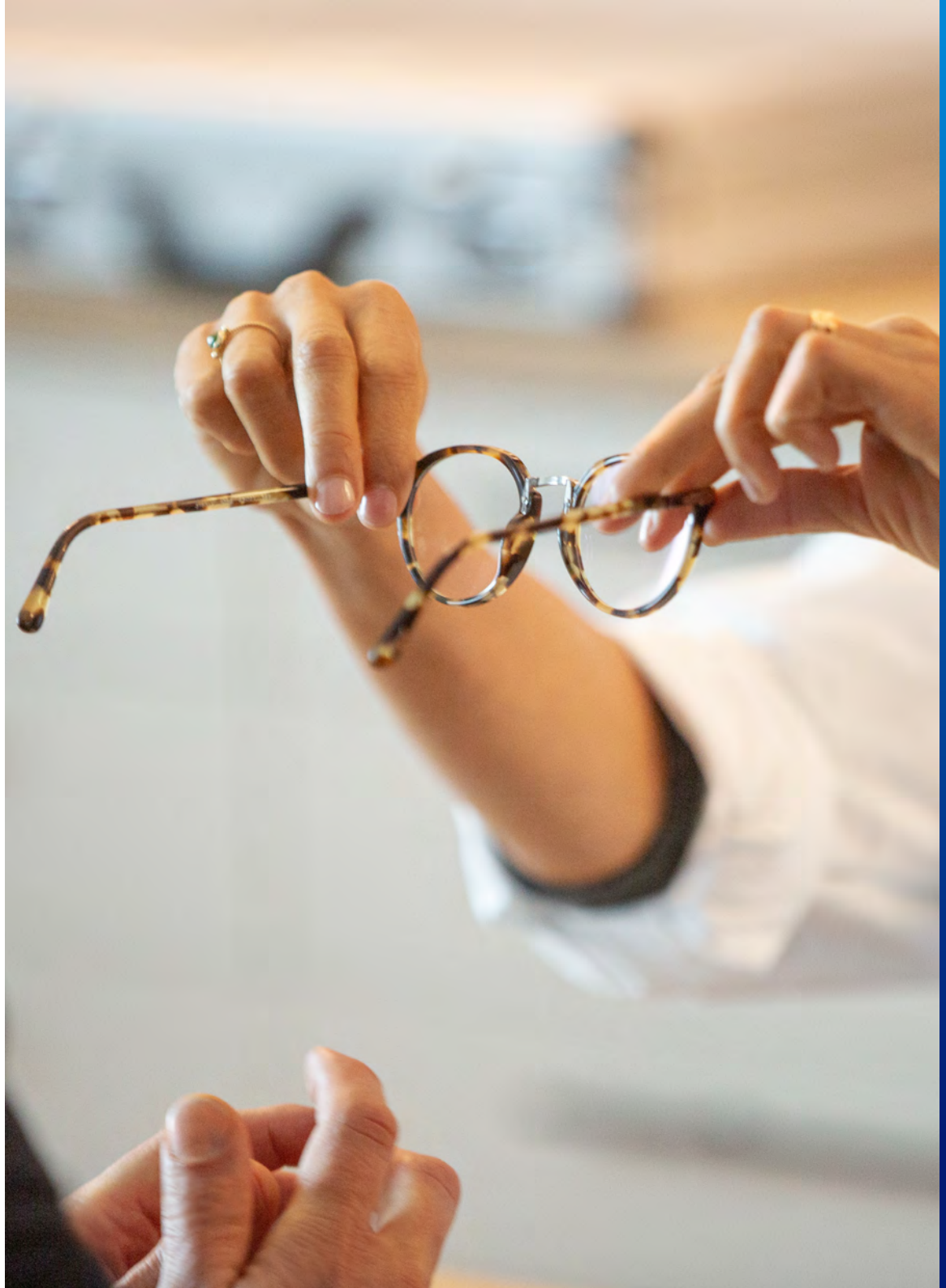
1 Check PDs and Heights

2 Clean the lenses before fitting the frame to remove all the blue layer on the edges

3 Cleaning with Essiclean or equivalent to remove the stampings without damaging the coating

4 Refit and restore the fitting crosses for the delivery stage.

Delivery and final fitting



Delivery

Check the fit of the frame on the patient's face as they wish to wear it, ensuring that it does not slip nor cause any discomfort or pain.

Check the quality of vision:

1. For distance vision use an acuity test
2. For near vision use a reading test
3. For overall vision. You can encourage the patient to move around the store whilst looking at their smartphone, to test transition between near and far vision in real-life conditions, and in a dynamic situation to confirm a seamless vision experience.

Provide recommendations and advice for the use of, and adaptation to, Varilux® lenses:

- Distance vision at eye level, looking straight ahead
- Near Vision in the lower part of the lens, by lowering the eye (slightly raising the eye if necessary)
- Ensure that, to start, all head and eye movement is carried out slowly.

Inform the patient about the learning period necessary for each new pair of lenses.

Delivery

Provide the wearer with the Varilux certificate of authenticity.

All Varilux lenses are tested and approved by wearers before they are made available – a unique standard guaranteeing quality and performance. It ensures wearer satisfaction, including fast and easy adaptation. Adaptation is guaranteed for Varilux® lenses and the Varilux® authenticity card gives assurance to wearers they are wearing authentic Varilux® lenses. It also helps identify the type of lens worn and the exact prescription.

Each Varilux lens features a discreet engraving that verifies its authenticity and quality. This Varilux® signature is found at the top of the lens.

Inform about the Essilor Satisfaction warranty*

Don't forget to give the wearer the post purchase leaflet, to ensure Varilux brand awareness and product understanding.

* Under this offer, the customer has one month from the date of delivery to express any persistent difficulty in adapting, despite wearing the spectacles regularly. If the cause of the difficulty requires that the spectacles be modified, replace the lenses, giving consideration to the analysis of the reasons for the failure to adapt. For this, comply with the conditions in the Essilor Progressive Lenses adaptation guarantee described in the general conditions of sale.

Delivery

Recommend that the lenses are always wiped with a microfiber cloth and, if they are very dirty, washed in lukewarm water and liquid soap or a suitable product that does not contain any harsh chemicals.

Recommend that spectacles should be stored in a case after use, never be put face down and never be exposed to a heat source (car windscreen, etc.)

Explain to the patient how presbyopia develops over time. Advise them to have their eyes checked regularly, so that they are always wearing a correction suitable for their needs, thus making it easier to adapt to a change of prescription.

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Troubleshooting

Solving Adaptation Problems

Explain to your patients that it should take from a few minutes up to one day to adjust to their new Varilux® lenses. Recommend that they wear their glasses as much as possible to assist in the adaptation process and to adapt to typical day to day activities, particularly if they have never previously worn glasses. **Should they need more than a few days to adjust, advise them to consider further consultation with the store.**

In the case of non-adaptation, it is necessary to follow a precise sequence in order to determine the problem. Thorough research must be conducted.

1. **Record the precise complaint of the wearer.** Type of problem encountered, frequency and particular circumstances of problem, distances concerned, expedient solutions found, etc.
2. **Measure lenses** (Power for distance vision, near vision and addition)
3. **Remark lenses** (Fitting crosses for distance vision and near vision circles)
4. **Check the correction of the lenses** (In distance vision and in near vision, frame positioned on the wearer's face)
5. **Check the adjustment of the frame** (Vertical and horizontal alignment, pantoscopic tilt and stability)
6. **Validate the wearer's prescription. Measure the visual acuity at distance** and the reading ability at near. Confirm the addition value.

Troubleshooting

Wearer complaints	Anti reflection	Pupillary distance NV	Pupillary distance DV	Fiting Height	Distance vision Prescription	Near addition	Frame fit	Vertex Distance (Lens/Eye)	Inclination of the frame	Previous correction	Astigmatism	Possible solution
Has to raise head or lift lenses to read				◆	◆	◆	◆			◆		•Modify the adjustment by lifting the frame •Mount new lenses higher up •Increase the distance or near prescription
Needs to lower head or lenses to see better in distance vision				◆	◆	◆	◆			◆		•Modify the adjustment by lowering the frame •Mount new lenses lower •Reduce the distance or near prescription
Needs to tilt head to see clearly		◆	◆	◆						◆	◆	•Modify the frame adjustement •Modify the centration •Check the prescription for astigmatism
Has to lift head to read but lowers head for distance				◆	◆	◆	◆			◆		•Check for prism thinning intolerance
Has a very reduced near vision field. Fatigue after prolonged work in near vision	◆	◆	◆	◆	◆	◆	◆	◆		◆		•Modify the centration: Mount lenses higher •Check the prescription for astigmatism •Reduce the addition •Reduce the addition and increase the distance power
Sees out of focus in lateral vision			◆		◆	◆	◆		◆	◆		•Check the distance PDs and modify the centration •Verify the balance between right and left lenses •Check the adjustment and the pantoscopic •Reduce the addition •Reduce the distance power

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Troubleshooting

Wearer complaints	Anti reflection	Pupillary Distance NV	Pupillary Distance DV	Fiting Height	Distance vision Prescription	Near addition	Frame fit	Vertex Distance (Lens/Eye)	Inclination of the frame	Previous correction	Astigmatism	Possible solution
Sees double at distance or near or both		◆	◆	◆	◆	◆	◆		◆	◆	◆	•Compare with the previous correction •Check the distance and near pupillary distances and heights to confirm centration •Check the distance and near powers, astigmatism and balance between right and left eyes •Check the adjustment and pantoscopic angle
Sees light sources doubled	◆										◆	•Check the prescription for astigmatism •Make new lenses with anti-reflective coating
Sees lines deformed		◆	◆	◆		◆			◆		◆	•Check the distance and near PDs and heights to check centration •Modify the adjustment by lifting the frame or mount the new lenses higher •Check the prescription for astigmatism •Reduce the addition
Has burning, itching sensation, feels ocular fatigue	◆	◆		◆	◆	◆				◆	◆	•Compare with previous correction •Check the distance and near PD's and heights to check centration •Check the distance and near powers, astigmatism and balance between right and left eyes •Make new lenses with an anti-reflective coating

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Conclusion

As Varilux® brand, we can bring **personalization of the lenses to the ultimate level**. So this guide, developed with the R&D experts and global education team, focuses on the specificities of Varilux® lenses.

Varilux® Fitting Guide as a reference guide, is the first step to ensure that ECPs feel comfortable about how to proceed at each step of the patient journey in order **to deliver the best performing Varilux® lenses**.

It is to reinforce ECPs demonstrating their expertise and legitimacy as dispensers by reaching full patient satisfaction about their vision and providing unique custom-made in-store experiences.

Varilux® has been able to stay at the forefront of innovation and highly **satisfy patients' needs for more than 60 years** thanks to great eyecare professionals. To equip an even bigger number of patients in the future we'll continue to work hand in hand to get qualified ECPs, at ease with recommending and dispensing. We are thankful for your daily commitment along with the brand. We have built the past 60 years with you and we trust you to shape the future together.

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