

# Varilux® XR series™

Varilux®

#1 varifocal lens brand

worldwide\*



## The first eye-responsive varifocal lens

Instant sharpness even in motion



essilor

# How hard are our eyes working?

**Did you know that our eyes move more than 100,000<sup>1</sup> times a day!**

We live in an era of information overload that is increasingly on the go. Information navigates faster.

**Indeed we are constantly in motion: it's either our environment, our body, our head or our eyes.**

We conducted an international survey with over 4,000 varifocal lens wearers. More than **30% declared that mobility situations can remain a visual challenge.**<sup>4</sup>



**Multitasking**  
with multiscreens



**125 billion**  
devices by 2030<sup>2</sup>



**Checking**  
notifications all day long



**80**  
notifications/day<sup>3</sup>



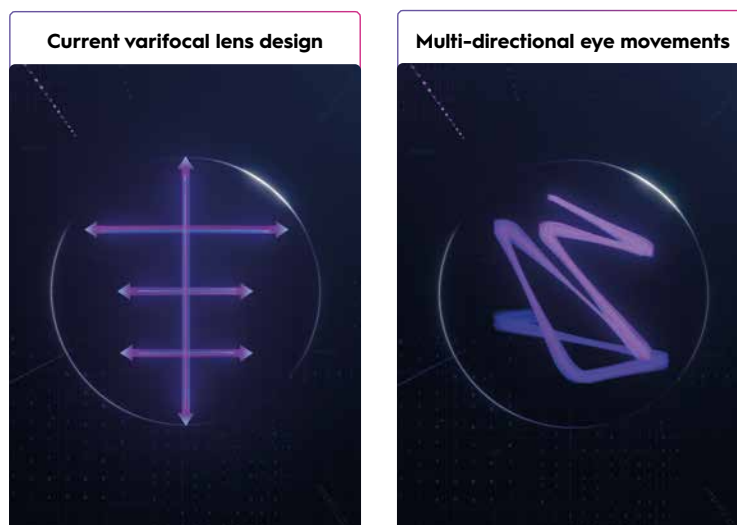
**Switching**  
between screens (dashboard, GPS)  
and the road while commuting

Maintaining sharp vision while moving requires **additional effort** from our eyes.

Varifocal lens wearers subconsciously adapt their behaviour to maintain visual sharpness: they may take a millisecond to adjust, slow down or even stop moving.

## Why?

**Current varifocal lens designs have a linear conception. However eye movements are much more multi-directional: this may force the eyes to work harder when changing gaze direction rapidly.**



**In order to achieve sharp vision at all times, clarity across the lens and efficient eye movements are required.**

1. Peter H. Schiller, Edward J. Tehovnik, Neural mechanisms underlying target selection with saccadic eye movements, Progress in Brain Research, Elsevier, Volume 149, 2005, Pages 157-171.  
2. Mintel Global Consumer Trends 2020 - April 2020.  
3. Acer, Utku & Mashhadi, Afra & Forlivesi, Claudio & Kawsar, Fahim. (2015). Energy Efficient Scheduling for Mobile Push Notifications. EAI Endorsed Transactions on Energy Web.  
4. Essilor International - Varilux® XR series™ lens - Consumer Expectations and Behaviours with varifocal Lenses - IPSOS - BR/FR/IT/UK/US - Q1 2022 (n=4062 varifocal lenses wearers).

# Unique lens conception leveraging behavioural artificial intelligence

**For the very first time, a Varilux® lens has been designed with behavioural artificial intelligence.** Beyond the prescription and eye physiology the design now considers **visual behaviour**, a pre-requisite for fast and precise eye movements.

More than **1 million** pieces of data from exclusive research, real life wearer tests and wearer behavioural and postural measurements in practice were collected and analysed.

This enabled us to create the digital twin of the patient in it's 3D environment, reproducing real life situations to predict it's visual behaviour profile<sup>5</sup>.

**This AI system is composed of several elements:**



## **Wearer parameters**

Age  
Prescription  
Pupillary distance  
Eye/head coefficient  
Pupil size



## **Predictive models**

Visual acuity loss  
Head/eye coordination  
Accommodation  
Gaze behaviour  
Postural efforts



And for the first time two new predictive models of visual behaviour were defined:

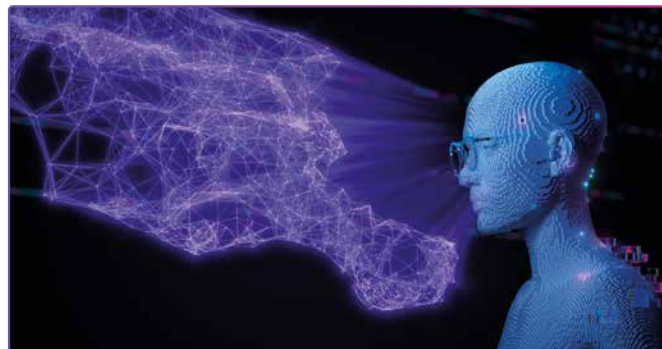
- **Gaze lowering model**
- **Accommodation model**

For every single prescription, the visual behaviour profile is established **to design a varifocal lens that respects the natural eye behaviour.**

**A new standard, named volume of broadband vision**, calculates the 3D area where the wearer can benefit from extremely sharp vision of any visual target, even while moving, with a seamless ocular navigation between 30cm and infinity<sup>6</sup>.



Other premium  
varifocal lenses



**Varilux®**  
**XR series™**

Thanks to the extended volume of broadband vision **Varilux® XR series™ is the first eye-responsive varifocal lens<sup>7</sup>**, which predicts the visual behaviour of wearers (gaze lowering and object distances) thereby responding to how their eyes really move. This ensures sharp and fluid vision.



**+49%**

volume of broadband vision  
vs Varilux® X series™ lens<sup>8</sup>



**+67%**

volume of broadband vision vs other  
premium varifocal lenses from competitors<sup>9</sup>

5. Objects distances defined in a 3D environment as a function of gaze direction thanks to gaze lowering and accommodation exclusive models.

6. Volume of broadband vision is the volume of space between 30cm and infinity having: 1/ A binocular acuity loss lower than 0.15logMAR (eq. to a binocular visual acuity of ~ 8/10)  
2/ A power disparity lower than 0.15D 3/ A resulting astigmatism disparity lower than 0.25D.

7. Eye-responsive defined as the consideration of two parameters in the design of the varifocal lens: prescription and visual behaviour.

8. Internal R&D simulations - 2022 - vs Varilux® X series™ lens.

9. Internal Essilor International R&D simulations - 2022 - calculation based on lenses measurements - Analysis done on most relevant competitive brands offering premium varifocal lenses with good level of awareness among consumers (Consumer Lens Brand Tracking - Ipsos - Q3 2022 - BR/CA/CN/FR/IN/IT/UK/US - n=8000). Volume of broadband vision considers sharpness and fluidity of vision.



# New XR-motion™ technology: A visual behaviour-based optimisation

The XR-motion™ technology enables optimisation of both lenses according to the visual behaviour profile of the patient through two significant optimisations:

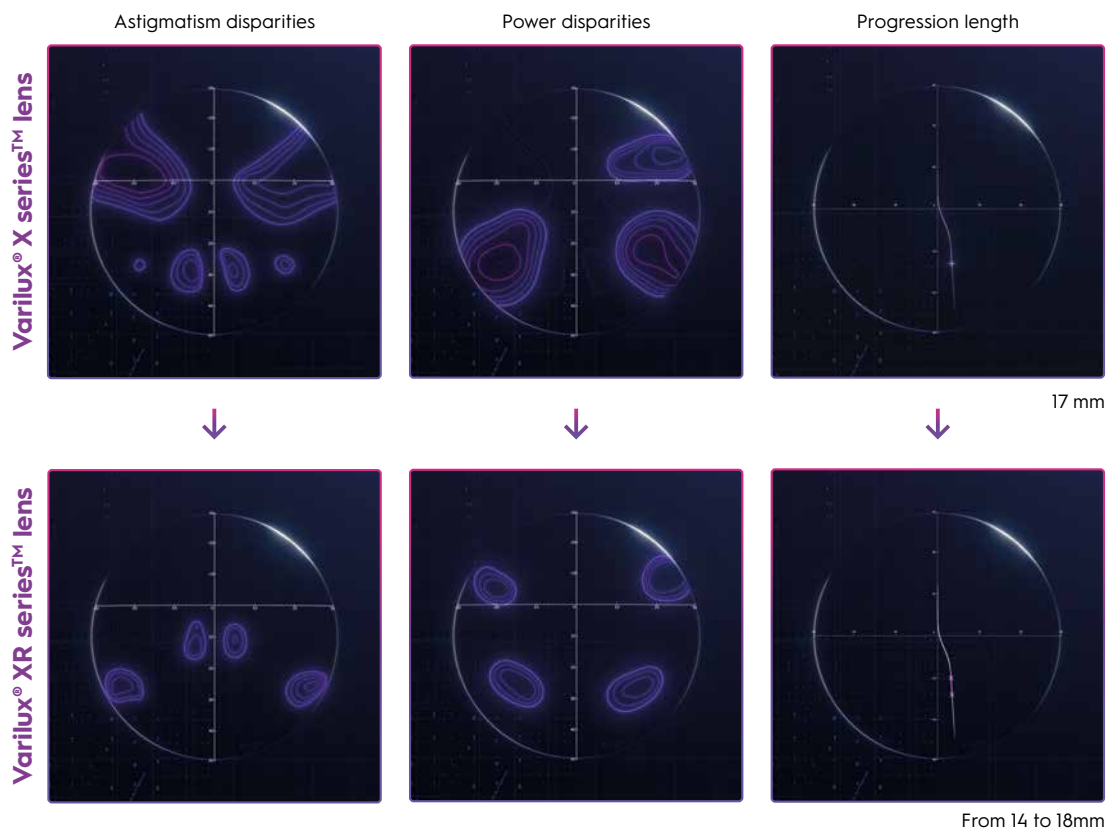


## 1. Taking binocular vision to the next level

Disparities are the difference between the optical defaults of the two eyes when looking at the same visual target. They can slow down eye movement. In addition to considering the prescription of the two eyes to design one lens, the visual behaviour profile allows us to optimise each focal point of the lens by reducing the optical disparities between the two eyes. As a result, this behaviour-based binocular optimisation offers high visual acuity wherever the patient needs it.

## 2. Precise positioning of the focus zones

Without any additional measurement, the gaze lowering model enables definition of the progression length at 0.1mm between 14mm and 18mm. This progression length may vary for each eye. The ultra-precise positioning of the focus zones guarantees a **natural eye navigation** from near to far.



Varilux XR series capitalises  
Varilux X Series lenses technologies:



Binocular mapping -2.00 (-0.25) 175° Add 2.00 / -1.75 (0) 0° Add 2.00 - coloured zones express the disparities, from 'light' in blue circle to 'strong' in pink.

# Outstanding visual experience

**73 varifocal lens wearers wearing mostly premium varifocal lenses, were equipped with Varilux® XR series™ lenses: When comparing them to their existing pair.**

Test carried out by an independent institute with identical prescriptions.

**Instant sharpness**  
at all distances



**Natural posture**  
in daily-life



**95%**

adapted on the first day<sup>10</sup>



**87%**

preferred them to their current premium varifocal lenses<sup>11</sup>

**Confidence and reactivity**  
on the move



**97%**

experienced better overall vision compared to their current varifocal lenses<sup>12</sup>



**2/3**

felt there was no visual discontinuity when changing from near to far vision<sup>10</sup>

**Precise, detailed vision**



**9/10**

experienced<sup>10</sup>

**Validated through performance evaluations:**

**1**

**14 key attributes**  
defined by  
varifocal lens  
wearers

**2**

**Digital twinning**  
technology to  
reproduce daily  
activities

**3**

**Tested against**  
high-end  
varifocal lenses  
of main  
competitors

**4**

**Approved by**  
an independent  
institute

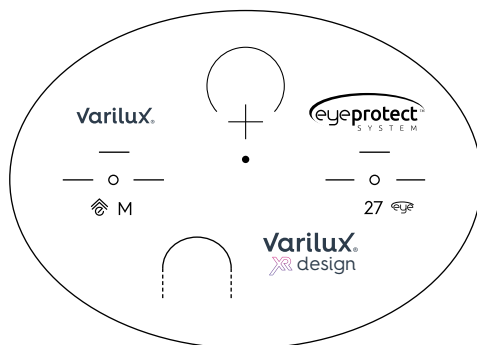
10. Essilor International – Varilux® XR series™ lens – in-life consumer study – Eurosinn – 2022 – France (n=73 varifocal lens wearers).

11. Essilor International – Varilux® XR series™ lens – in-life consumer study – Eurosinn – 2022 – France (among n=67/73 who expressed a preference).

12. Essilor International – Varilux® XR series™ lens – in-life consumer study – Eurosinn – 2022 – France (among n=60/73 who perceived a difference).

# Technical features

## Markings and engravings



## Control & mounting

Varilux® XR series™ lenses are optimised to deliver the prescribed power when worn. This impacts focimeter values, that's why the lenses are supplied with double labelling. The first line is the ordered value, in accordance to the prescription, the second line refers to the power Eye Care Professionals should report while checking the lens with the focimeter.

Example		Far Vision			Addition
G/L	DD	Sph	Cyl	Axe	Add
	70/75	+3.25	+0.75	030	+1.25
		+3.12	+0.62	025	+1.14

Prescribed power  
(wearer power)

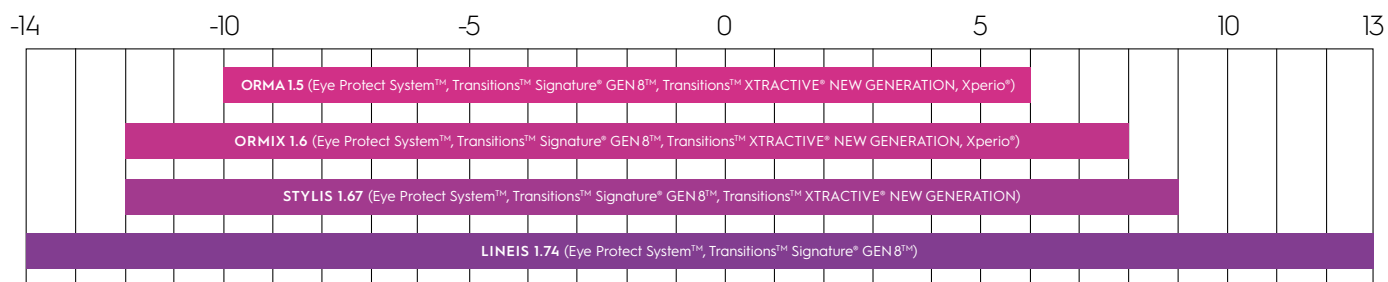
Expected measured  
power (focimeter power)

## Minimum fitting heights

<b>Varilux®</b> XR pro	14 mm
<b>Varilux®</b> XR track	14 mm
<b>Varilux®</b> XR design	18 mm
<b>Varilux®</b> XR design short	14 mm

This illustration is an example, each prescription will provide a different measurement.

## Manufacturing ranges



Addition range: +0.75 to +4.00

Cylinder range: 0.00 to +6.00

## Recommended technologies and coating combinations with Varilux® lenses



The Crizal® Shield stamp expresses the guarantee of the optimal protection Crizal® coatings provide to Essilor® lenses. Combined with Varilux® lenses, Crizal® protects the lenses from reflections, scratches, smudges, dust, water and the eyes from UV rays.

**EyeProtect System™**

Essilor® most imperceptible protection against UV and blue-violet light<sup>14</sup>

**Transitions™**  
Light Intelligent Lenses

Combined with Varilux® lenses, Transitions® Light Intelligent Lenses™ offer sharp vision indoors and outdoors, seamlessly adapting to changing light situations.

14. Eye Protect System™ lens feature has the lowest level of yellow residual tint (b\*) compared to other Essilor's blue cut solutions.

# Personalised range

**A comprehensive range** to offer the best of Varilux® XR series™ lenses.

Eyecode is available as an option on Varilux XR design / short and Varilux XR Track. It is compulsory on Varilux XR Pro.

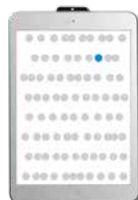
Dedicated information sheets are available for each personalised product detailing the parameters required when ordering.

**Varilux®**  
*XR* design

Fitting heights and  
monocular PDs



**Varilux®**  
*XR* track



Fitting heights and  
monocular PDs  
+ Frame parameters  
+ Near vision behaviour  
measurement



**Varilux®**  
*XR* pro



Fitting heights and  
monocular PDs  
+ Frame parameters  
+ Near vision behaviour measurement  
+ Eyes parameters  
(Dominant eye and  
Eye rotation centre)



# How to recommend Varilux® XR series™ to your patients

We live on the go and are hyper connected.  
With more than 100,000<sup>1</sup> movements per day our  
eyes need to make extra efforts to maintain  
sharpness while we are on the move.



Current varifocal lenses are conceived  
for standardised and linear eye behaviour,  
considering mainly prescription data



Varilux®, the #1 brand recommended by eye care  
professionals<sup>17</sup>, has just released Varilux® XR series™,  
the latest generation of varifocal lenses that know  
how our eyes really move



Varilux® XR series™ goes beyond your prescription.  
This lens responds to your visual behaviour predicted  
by artificial intelligence based on exclusive real life data.



Varilux® XR series™ offers instant sharpness at all  
distances even in motion, adaptation from the  
very first day<sup>10</sup> and natural eye navigation.

Find out more on:



LEONARDO



17. 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.  
\* Euromonitor, 2021 data; Retail value amongst spectacle lenses category, brands representing varifocal lenses.



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