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LUXSMART™
PRELOADED TORIC

PREMIUM HYDROPHOBIC IOL

For your daily range of vision

CATARACT GLAUCOMA LASER RETINA VISUALIZATION

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5 GREAT THINGS THAT LUXSMART™ HAS DEMONSTRATED COMPARED TO CONVENTIONAL MONOFOCAL IOLS[1,2]

- Significantly superior DCIVA and UIVA
- Comparable high levels of UDVA and CDVA
- Similar dysphotopsia profile with lower incidence of optical side effects
- High degree of patient satisfaction for daily life activities
- Enhanced spectacle independence from far to intermediate distances

1. Volkan Tahmaz, Sebastian Siebelmann, Konrad R. Koch, Claus Cursiefen, Achim Langenbucher & Robert Hoerster (2022): Evaluation of a Novel Non-Diffractive Extended Depth of Focus Intraocular Lens – First Results from a Prospective Study, Current Eye Research, DOI: 10.1080/02713683.2022.2074046

2. Campos, N., Loureiro, T., Rodrigues-Barros, S., Carreira, A. R., Moraes, F., Carreira, P., & Machado, I. (2021). Preliminary clinical outcomes of a new enhanced depth of focus intraocular lens. Clinical Ophthalmology (Auckland, NZ), 15, 4801.

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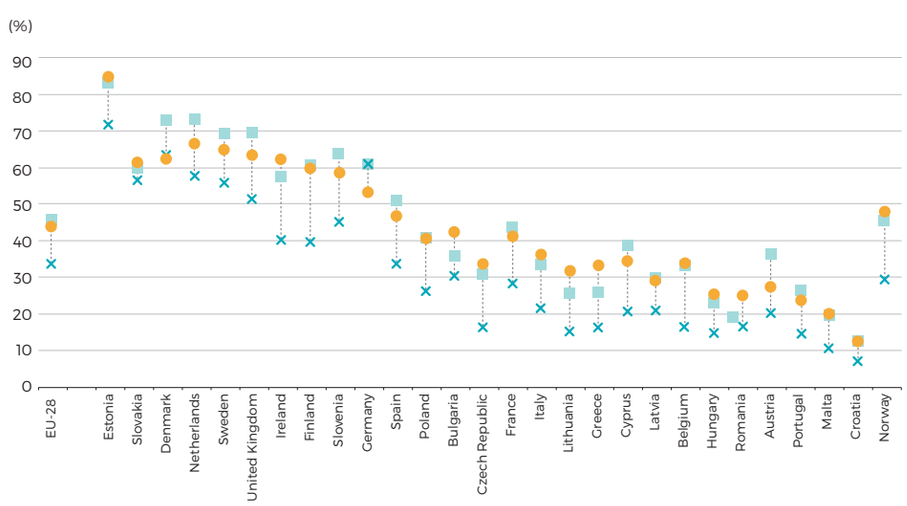
70s ARE THE NEW 40s

The ESCRS Functional Vision Working Group reported that Europeans who are 55 years and older spend at least **6 hours per day on leisure activities**[3], including playing games and computer use, relaxing/thinking, reading, watching television, socializing and communicating, participating in exercise, recreation, and other activities, including travel.

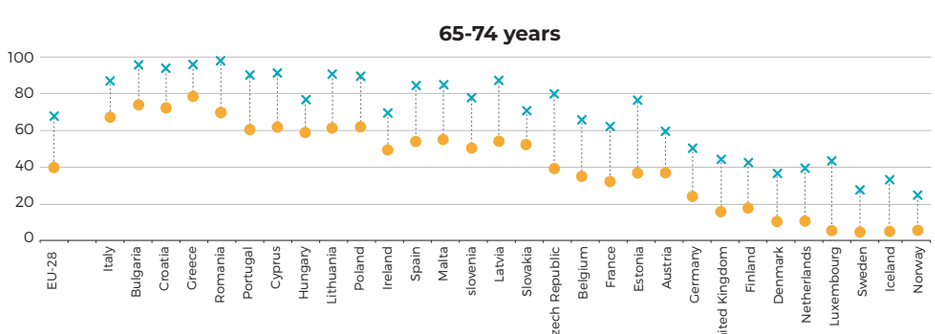
Figure 1. People aged ≥ 50 years old spending at least 3 hours per week on physical activity outside work



50-64 years
65-74 years
≥75 years

Source:

Figure 2. People aged 65-74 years who have never used a computer, 2008 vs. 2017



2008
2017

Source:

3. Ribeiro, Filomena MD, PhD; Cochener, Beatrice MD, PhD; Kohnen, Thomas MD, PhD; Mencucci, Rita; Katz, Gregory PhD, PharmD, MBA; Lundstrom, Mats MD, PhD; Casanovas, Antoni Salvà MD, PhD; Hewlett, David Definition and clinical relevance of the concept of functional vision in cataract surgery ESCRS Position Statement on Intermediate Vision, Journal of Cataract & Refractive Surgery: February 2020 - Volume 46 - Issue - p S1-S3 doi: 10.1097/j.jcrs.0000000000000096

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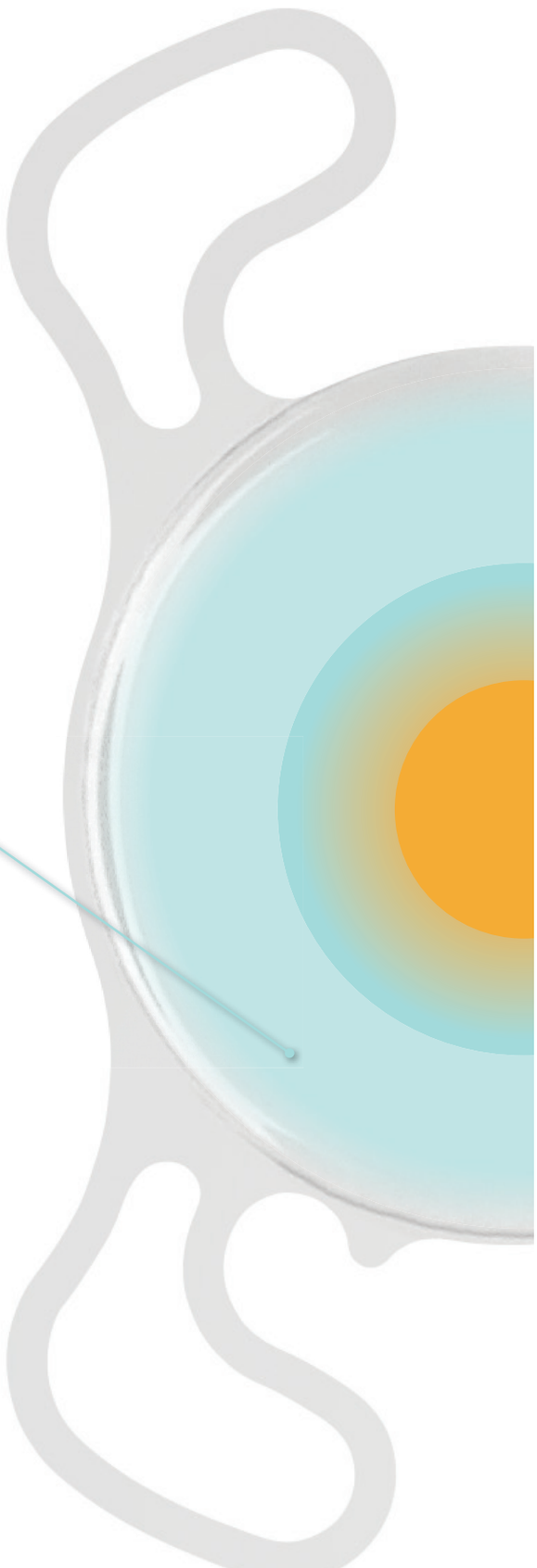
OPTICAL CONCEPT

PURE REFRACTIVE OPTICS (PRO) Technology

With no diffractive optical profile; the IOL* has a refractive surface across the entire optical diameter

PERIPHERY

Refractive aspheric surface



*IOL: Intraocular lens

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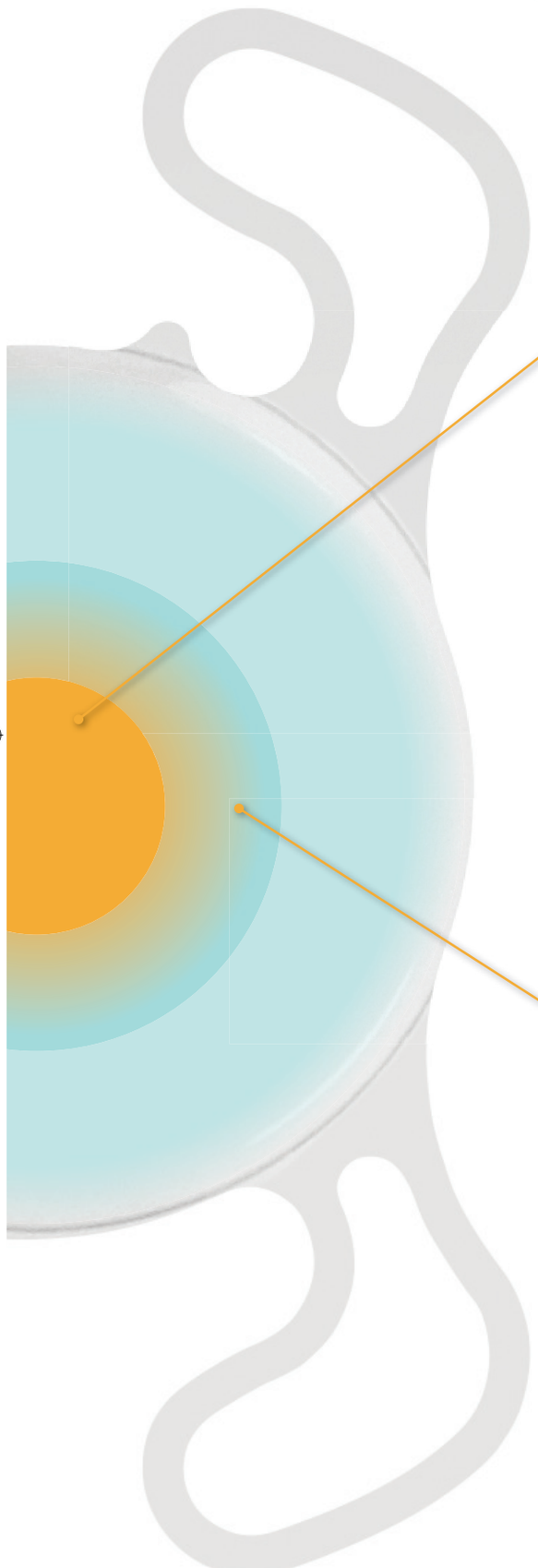

ELONGATED FOCUS CENTER

2 mm center with combination of 4th and 6th orders of spherical aberration of opposite signs

PATENTED TRANSITION ZONE

Transition zone designed to smoothly decrease the optic vergence from the center to the periphery

Transition designed to take part of the 4th and 6th orders of spherical aberration management

Transition designed to control the trajectory of light rays to ensure no light is outside the range of vision
(no light loss)

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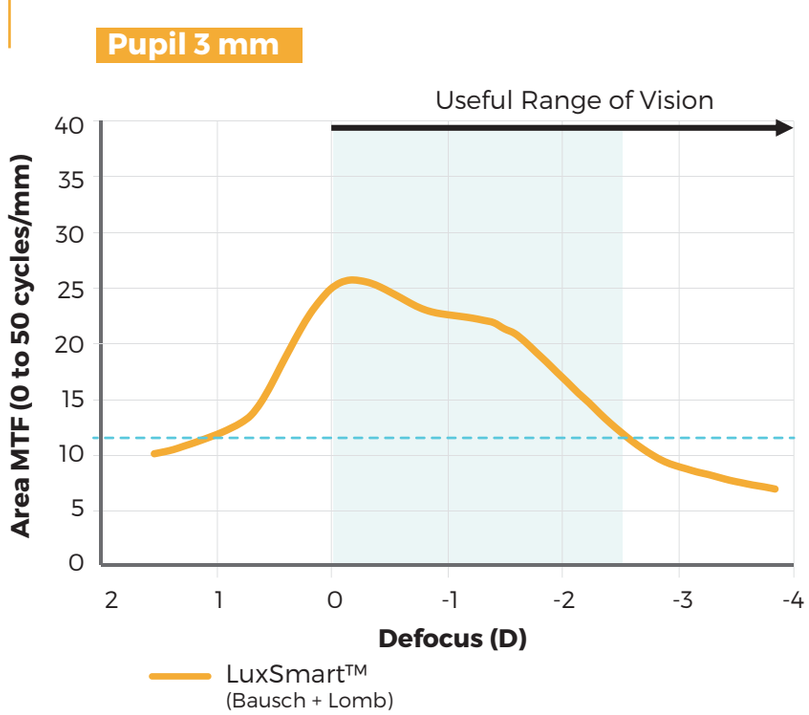
The Area under the Modulation Transfer Function (MTFa) and its relationship with the Visual Acuity

The MTFa is an objective in vitro MFT-based metric to assess the optical quality of an intraocular lens: the larger the MTFa value, the better the IOL optical quality

As opposed to MTF at single spatial frequency, the MTFa is the area under the MTF curve calculated from 0 to 50 cycles/mm.

Studies[4,5,6] have shown high correlation between MTFa and clinical visual acuity, so that it can be used to predict the visual performance at different levels of focus of pseudophakic patients.

Figure 3. LuxSmart™ experimental Through-focus MTFa and predicted defocus range[7]



For defocus values where the MTFa value is ≥ 12 (dotted line), the expected visual acuity would be around 0.2 log MAR (required for driving license)

Figure 4. Depth of Focus comparison of experimental Through-focus MTFa and predicted defocus range for LuxSmart™ (Bausch + Lomb) and Acrysof™ IQ Vivity™ (Alcon)[7]

For defocus values where the MTFa value is ≥ 20, the expected visual acuity would be around 0.0 logMAR.

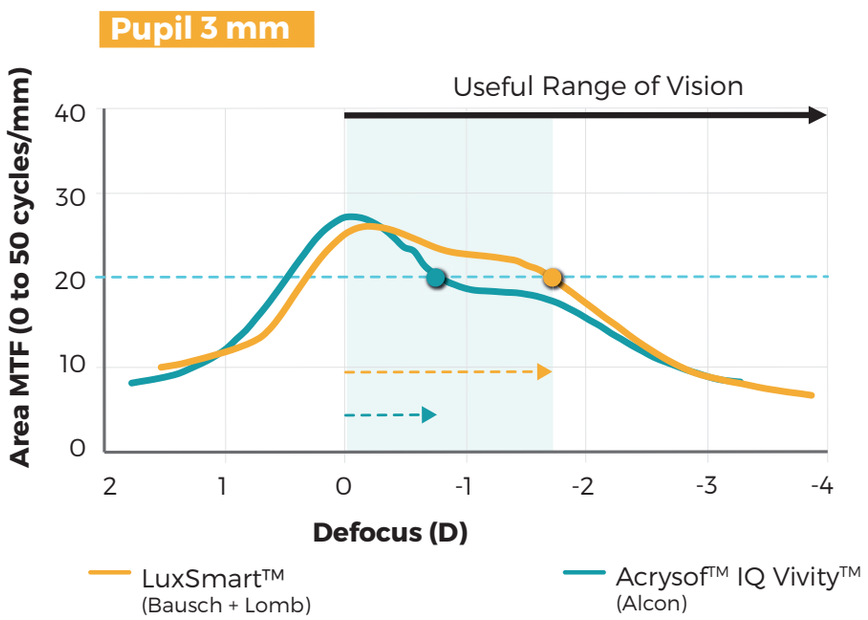
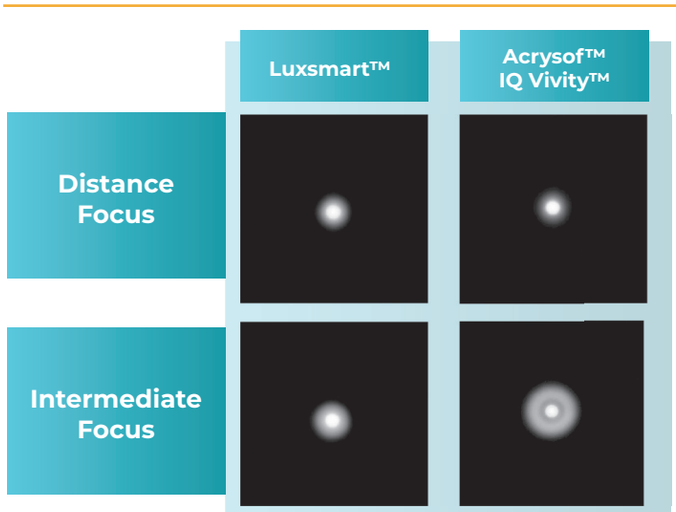


Figure 5. Pinhole images and halos for LuxSmart™ (Bausch + Lomb) and Acrysof™ IQ Vivity™ (Alcon) at distance (top) and intermediate (+1.50 D) focus (bottom) at 4.5 mm pupil. Images are displayed in logarithmic scale for visualization purposes[7]



Images of a pinhole object obtained at the distance focus of each lens with pupils of 4.5 mm. The images are displayed in logarithmic grayscale. The pinhole is a small but extended object which subtends an angle with respect to the model eye similar to the angle subtended by a car headlight of 10 cm observed at 100 m.

A double halo structure has an inner part with higher intensity due to the overlapping of the intermediate and distance defocused contributions

4. Visual acuity of pseudophakic patients predicted from in-vitro measurements of intraocular lenses with different design. F. Vega et al. Biomed. Opt. Express 9, 4893-4906 (2018).
5. Preclinical metrics to predict through-focus visual acuity for pseudophakic patients. A. Alarcon et al. Biomed. Opt. Express 7, 1877-1888 (2016).
6. Equivalence of two optical quality metrics to predict the visual acuity of multifocal pseudophakic patients. J. Armengol et al. Biomed. Opt. Express 11, 2818-2829 (2020)
7. Comparative optical bench analysis of a new extended range of vision intraocular lens. Juan Antonio Azor, Fidel Vega, Jesus Armengol, Maria S. Millan Grupo de Optica Aplicada y Procesado de Imagen (GOAPI). Department of Optics and Optometry Universitat Politecnica de Catalunya BARCELONATECH

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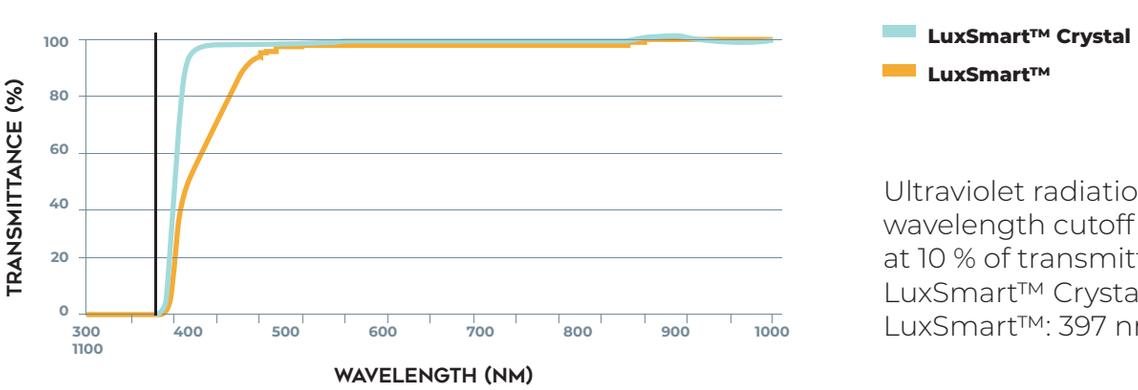
FOR OPTIMIZED EFFECTIVENESS AGAINST PCO*

LuxSmart™ has a 360° continuous square edge on the posterior surface **to reduce incidence of posterior capsule opacification** in preventing epithelial lens cell migration under the IOL optic.[8]

Nixon and Woodcock[9] demonstrated that a **continuous 360° square edge had significantly less PCO than a square edge that was interrupted at the optic–haptic junction.**

PROTECTION FROM UV LIGHT



Ultraviolet radiation wavelength cutoff values at 10 % of transmittance:
LuxSmart™ Crystal: 393.5 nm
LuxSmart™: 397 nm

Figure 6. Spectral transmision curves of LuxSmart™ and LuxSmart™ Crystal. The continuous vertical line marks the separation (380 nm) between the ultraviolet band and the visible spectrum.

*PCO: Porterior capsule opacification

8. BAUSCH + LOMB data on file: RD-R-015. Measurement of sharp edge.
9. Nixon DR, Woodcock MG. Pattern of posterior capsule opacification models 2 years postoperatively with 2 single-piece acrylic intraocular lenses. J Cataract Refract Surg 2010; 36:929–934

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PLATFORM STABILITY

The shape of the LuxSmart™ has been designed to optimize its post-operative behavior in the capsular bag.

IOLs with a similar 4-point fixation haptic design have shown:

- To have **good centration**[10]
- To have similar **postoperative performances in terms of CDVA, inflammation and PCO** compared with the C-loop design[10]
- To have **rotational stability**. 90 % of lenses rotate less than 5 degrees at 6 months[11]
- To be **stable in the eye** and even suitable for the application of a toric surface to correct corneal astigmatism[12]

Orientation features of the LuxSmart™ IOL have been designed close to the optic edge **to facilitate visualization, specially in case of constricted iris.**

10. Mingels, A., Koch, J., Lommatzsch, A. et al. Comparison of two acrylic intraocular lenses with different haptic designs in patients with combined phacoemulsification and pars plana vitrectomy. Eye 21, 1379–1383 (2007).
11. Kwartz J, Edwards K Evaluation of the long-term rotational stability of single-piece, acrylic intraocular lenses. British Journal of Ophthalmology 2010;94:1003-1006
12. Buckhurst, Phillip J.; Wolffsohn, James S. PhD; Naroo, Shehzad A. PhD; Davies, Leon N. PhD Rotational and centration stability of an aspheric intraocular lens with a simulated toric design, Journal of Cataract & Refractive Surgery: September 2010 - Volume 36 - Issue 9 - p 1523-1528

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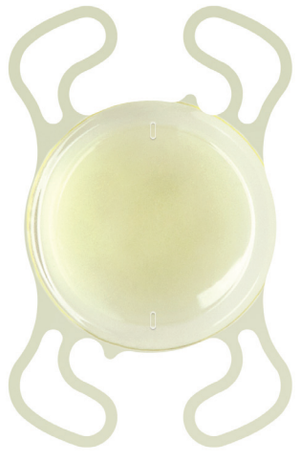
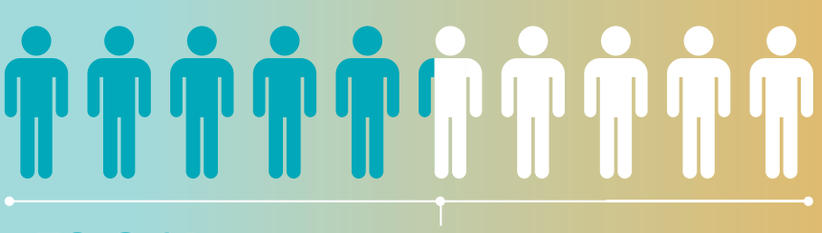


THE CLINICAL NEED FOR ASTIGMATISM CORRECTION

A significant number of patients today are not treated for astigmatism, despite the need.

34.8 % of cataract patients > 1.00 D corneal astigmatism[13]



52.8 % Market potential for Toric IOLs[14]

But **7 %** of all IOL procedures are toric IOLs[14]

Small amount of astigmatism has the potential to affect functional and low-contrast visual acuity[15], and has an impact on the visual comfort of computer users[16]

13. Teresa Ferrer-Blasco, Robert Montés-Micó, Sofia C. Peixoto-de-Matos, José M. González-Méijome, Alejandro Cerviño. Prevalence of corneal astigmatism before cataract surgery. Journal of Cataract & Refractive Surgery, Volume 35, Issue 1, 2009.
14. Market Scope 2019
15. Miller A, Kris M, Griffiths A. Effect of small focal errors on vision. Opt Vis Sci. 1997;74(7):521-526
16. Rosenfield M. Computer vision syndrome: a review of ocular causes and potential treatments. Ophthalmic Physiol Opt. 2011 Sep;31(5):502-15. doi: 10.1111/j.1475-1313.2011.00834.x. Epub 2011 Apr 12. PMID: 21480937.

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CALCULATING TORIC IOL POWER WITH LUXSMART™

Emmetropia Verifying Optical (EVO) Toric Formula, an advanced IOL formula for cataract surgery.[17]

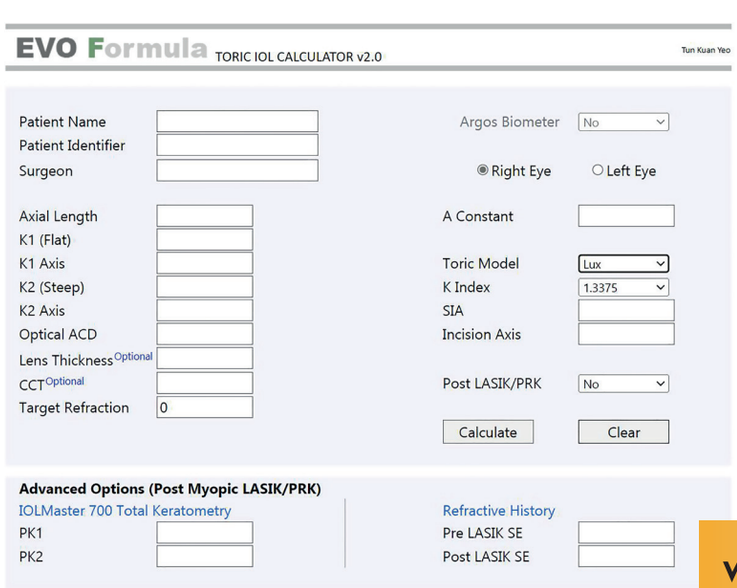
It is based on the theory of emmetropization and generates an 'emmetropia factor' for each eye. As a thick lens formula, it takes into account the optical dimensions of the eye, and can handle different IOL geometry and powers.

When calculating toric IOLs, it combines:

- **Theoretical posterior cornea astigmatism prediction**
- **Thick lens modelling**
- **Dynamically interconnected prediction of IOL power and toricity**

A retrospective evaluation of the EVO Toric Formula performed in a multi-centered clinical trial including 10 surgeons, based on 109 eyes implanted with enVista® toric found[18]:

- A residual astigmatism prediction error ≤ 1.0 D in 87.2 % of eyes
- In 77 % of eyes, the EVO Toric Calculator predicted orientation matched the theoretical post-operative refractive astigmatism
- Arithmetic mean residual astigmatism prediction error was 0.59 D ± 0.36 D
- The Barrett Toric Calculator and EVO Toric Calculator had similar performance with regards to their astigmatism prediction accuracy



Access to the EVO Toric IOL Calculator selecting "Lux" toric model

www.evoiolcalculator.com

17. https://evoiolcalculator.com/start.aspx
18. Pantanelli SM, Sun A, Kansara N, Smits G. Comparison of Barrett and Emmetropia Verifying Optical Toric Calculators. Clin Ophthalmol. 2022;16:177-182https://doi.org/10.2147/OPTH.S346925

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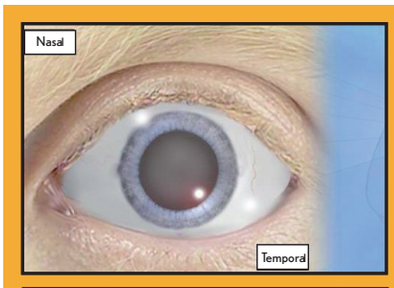
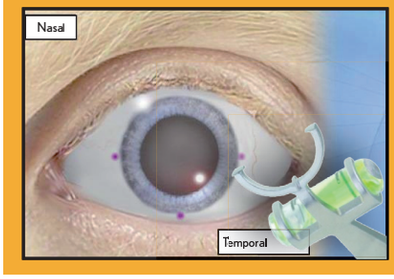
SURGICAL MARKING GUIDE FOR TORIC IOL

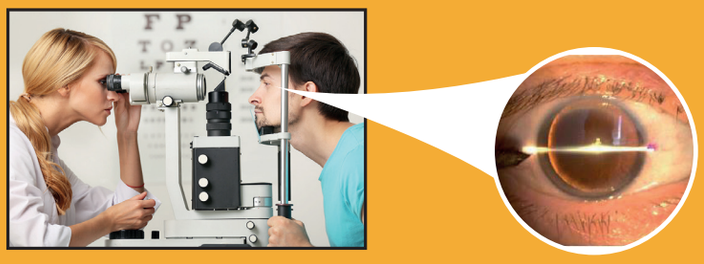
Tips endorsed by Dr. Álvaro Rodríguez-Ratón (Spain)

0º - 180º reference marks with bubble marker

- Mark the patient seated
- Instill anesthetic eye drops
- Paint the bubble marker with a marker pen. With the patient facing forward and making the bubble arranged between the two marks of the level, touch the eye with the marker making it coincide with the orientation 0º - 180º.







HOW TO MAKE THE MARKS WITH A SLIT LAMP:
Patient seated and with the head perfectly placed in the chinrest. Aligning the light and the observation system of the slit lamp, rotate the light beam to position it on the 0°-180° axis and mark the limbus.

Intraoperative marking with Whitman marker or with Mendez ring

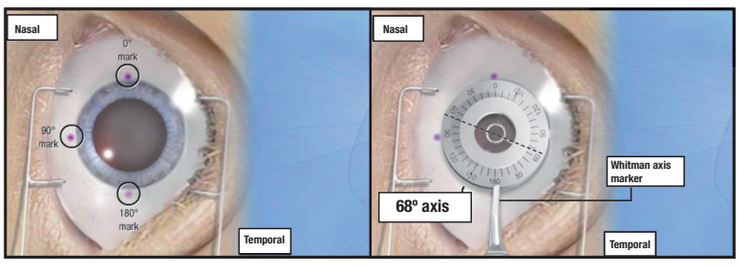
1. With the patient lying down.

2a. Turn the inner ring of the Whitman marker to match the targeted IOL position. Transfer ink with a marker on the 2 reference lines underneath the Whitman's ring. Place the marker on the cornea, matching its shaft (handle) with the previously marked horizontal reference

2b. With the Mendez ring, directly mark the orientation of the axis on the ocular surface with a pen.

Whitman marker

Mendez ring



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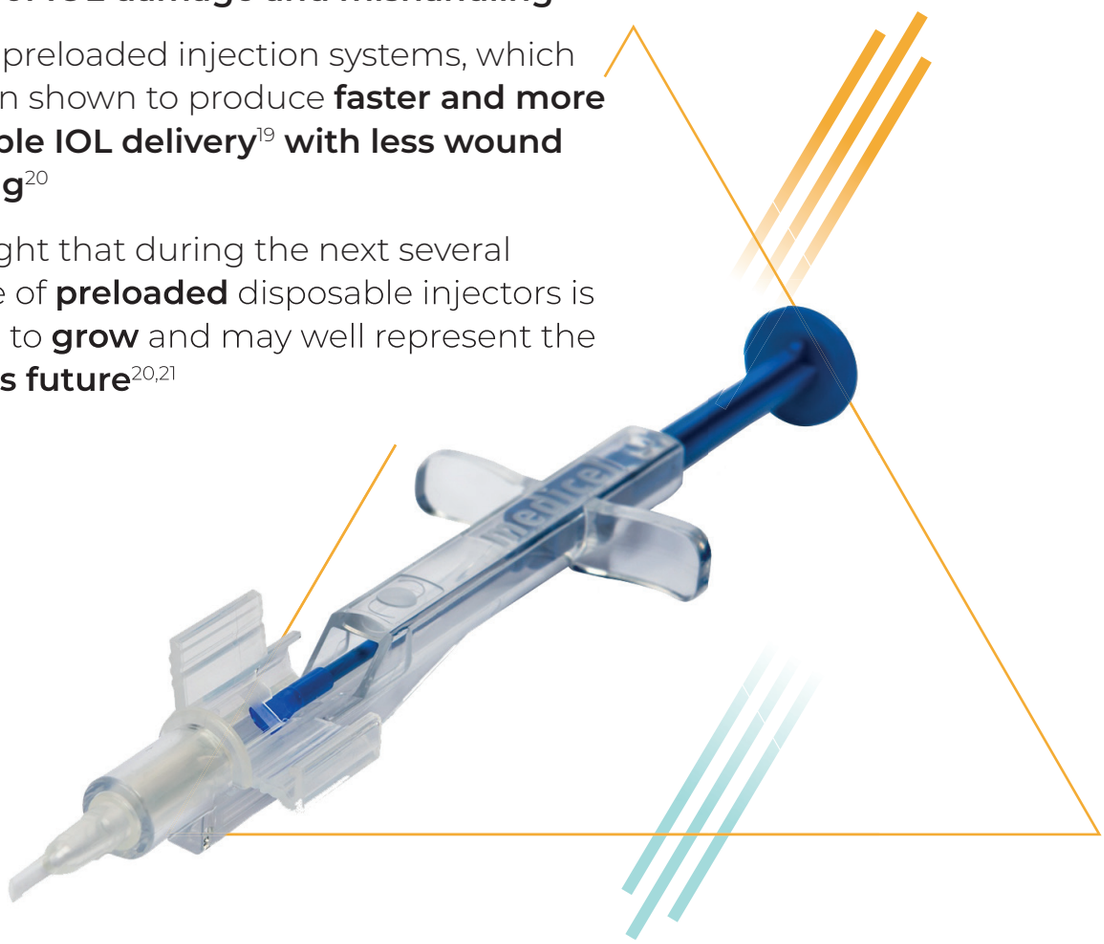
SINGLE STEP FULLY PRELOADED INJECTION

LuxSmart™ and LuxSmart™ Crystal are only available in a preloaded version, taking the advantage of:

- **Less risk of IOL damage and mishandling**[19]
- Usage of preloaded injection systems, which have been shown to produce **faster and more predictable IOL delivery**[19] **with less wound stretching**[20]
- It is thought that during the next several years, use of **preloaded** disposable injectors is expected to **grow** and may well represent the **industry's future**[20,21]



LUXSMART™ LUXSMART™ CRYSTAL

19. Chung B, Lee H, Choi M, Seo KY, Kim EK, Kim TI. Preloaded and non-preloaded intraocular lens delivery system and characteristics: human and porcine eyes trial. Int J Ophthalmol 2018;11(1):6-11
20. Mencucci R, Favuzza E, Salvatici MC, Spadea L, Allen D. Corneal incision architecture after IOL implantation with three different injectors: an environmental scanning electron microscopy study. Int Ophthalmol. Published online: 01 February 2018. https://doi.org/10.1007/s10792-018-0825-2
21. 2022 IOL Market report. Market Scope

TECHNICAL SPECIFICATIONS

MATERIAL

Material:	Acrylic hydrophobic
Overall diameter:	11.00 mm
Optic diameter:	6.00 mm
Platform design:	Single piece, 4 fixation points and 360°posterior square-edges
Optical design:	Asphericity modulation design with the combination of 4th and 6th orders of spherical aberration of opposite signs
Haptics angulation:	0°
Light Filter:	**LuxSmart™ Crystal:** UV filter **LuxSmart™:** UV and violet filters
LuxSmart™	(YSMART+XX.XXD)
LuxSmart™ Crystal	(SMART+XX.XXD)
Diopter range:	From 0.00 D to +10.00 D (1.00 D steps) From +10.00 D to +34.00 D (0.50 D steps)
LuxSmart™ toric	(YSMARTTxxx+xxx)
Diopter range:	From +6.00 D to +10.00 D (1.00 D steps) From +10.50 D to +30.00 D (0.50 D steps) From +31.00 D to +34.00 D (1.00 D steps)
Cylinder power – IOL Plane:	+0.75 D / +1.00 D / +1.50 D / +2.25 D / +3.00 D / +3.75 D / +4.50 D / +5.25 D / +6.00 D Some availability exceptions for high or low sphere powers. Check in the next page
Refractive index:	1.54 at 35°
Orientation features:	Top right and bottom left

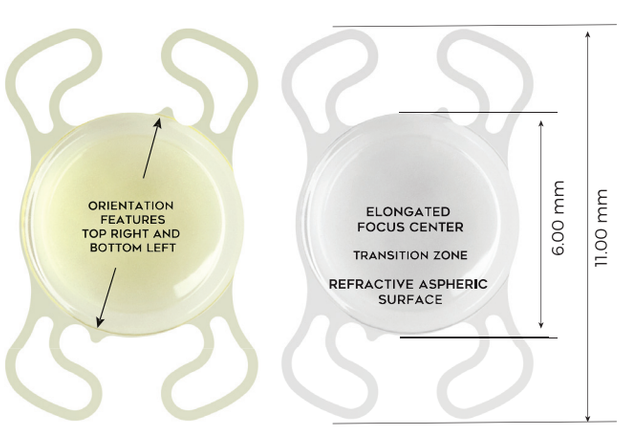
DELIVERY SYSTEM

Fully preloaded system with push injection:

Accuject™ Pro

Recommended incision size:

≥ 2.2 mm



CONSTANTS*

OPTICAL CONSTANTS

SRK/T A constant: 118.5

Hoffer Q pACD: 5.23

Holladay I Surgeon factor: 1.48

EVO A constant: 118.5

Barret A constant: : 118.4 / Lens Factor: 1.57

Hill-RBF A constant: 118.32

Scan the code to access a real implantation video.
Courtesy of Dr. Hoerster, Germany

*Constants are estimates only. It is recommended that each surgeon develops their own values.

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Available IOL

+6.00 D to +10.00 D (1.00 D steps)
+10.50 D to +30.00 D (0.50 D steps)
+31.00 D to +34.00 D (1.00 D steps)

IOL plane power	Cylinder power (D)								
Spherical equivalent power (D)	0.75 D	1.00 D	1.50 D	2.25 D	3.00 D	3.75 D	4.50 D	5.25 D	6.00 D
+6.00 D	0.75 D	1.00 D	1.50 D						
+7.00 D	0.75 D	1.00 D	1.50 D	2.25 D	3.00 D	3.75 D			
+8.00 D	0.75 D	1.00 D	1.50 D	2.25 D	3.00 D	3.75 D	4.50 D	5.25 D	6.00 D
+9.00 D	0.75 D	1.00 D	1.50 D	2.25 D	3.00 D	3.75 D	4.50 D	5.25 D	6.00 D
+10.00 D	0.75 D	1.00 D	1.50 D	2.25 D	3.00 D	3.75 D	4.50 D	5.25 D	6.00 D
+10.50 D	0.75 D	1.00 D	1.50 D	2.25 D	3.00 D	3.75 D	4.50 D	5.25 D	6.00 D
+11.00 D	0.75 D	1.00 D	1.50 D	2.25 D	3.00 D	3.75 D	4.50 D	5.25 D	6.00 D
+11.50 D	0.75 D	1.00 D	1.50 D	2.25 D	3.00 D	3.75 D	4.50 D	5.25 D	6.00 D
+12.00 D	0.75 D	1.00 D	1.50 D	2.25 D	3.00 D	3.75 D	4.50 D	5.25 D	6.00 D
+12.50 D	0.75 D	1.00 D	1.50 D	2.25 D	3.00 D	3.75 D	4.50 D	5.25 D	6.00 D
+13.00 D	0.75 D	1.00 D	1.50 D	2.25 D	3.00 D	3.75 D	4.50 D	5.25 D	6.00 D
+13.50 D	0.75 D	1.00 D	1.50 D	2.25 D	3.00 D	3.75 D	4.50 D	5.25 D	6.00 D
+14.00 D	0.75 D	1.00 D	1.50 D	2.25 D	3.00 D	3.75 D	4.50 D	5.25 D	6.00 D
+14.50 D	0.75 D	1.00 D	1.50 D	2.25 D	3.00 D	3.75 D	4.50 D	5.25 D	6.00 D
+15.00 D	0.75 D	1.00 D	1.50 D	2.25 D	3.00 D	3.75 D	4.50 D	5.25 D	6.00 D
+15.50 D	0.75 D	1.00 D	1.50 D	2.25 D	3.00 D	3.75 D	4.50 D	5.25 D	6.00 D
+16.00 D	0.75 D	1.00 D	1.50 D	2.25 D	3.00 D	3.75 D	4.50 D	5.25 D	6.00 D
+16.50 D	0.75 D	1.00 D	1.50 D	2.25 D	3.00 D	3.75 D	4.50 D	5.25 D	6.00 D
+17.00 D	0.75 D	1.00 D	1.50 D	2.25 D	3.00 D	3.75 D	4.50 D	5.25 D	6.00 D
+17.50 D	0.75 D	1.00 D	1.50 D	2.25 D	3.00 D	3.75 D	4.50 D	5.25 D	6.00 D
+18.00 D	0.75 D	1.00 D	1.50 D	2.25 D	3.00 D	3.75 D	4.50 D	5.25 D	6.00 D
+18.50 D	0.75 D	1.00 D	1.50 D	2.25 D	3.00 D	3.75 D	4.50 D	5.25 D	6.00 D
+19.00 D	0.75 D	1.00 D	1.50 D	2.25 D	3.00 D	3.75 D	4.50 D	5.25 D	6.00 D
+19.50 D	0.75 D	1.00 D	1.50 D	2.25 D	3.00 D	3.75 D	4.50 D	5.25 D	6.00 D
+20.00 D	0.75 D	1.00 D	1.50 D	2.25 D	3.00 D	3.75 D	4.50 D	5.25 D	6.00 D
+20.50 D	0.75 D	1.00 D	1.50 D	2.25 D	3.00 D	3.75 D	4.50 D	5.25 D	6.00 D
+21.00 D	0.75 D	1.00 D	1.50 D	2.25 D	3.00 D	3.75 D	4.50 D	5.25 D	6.00 D
+21.50 D	0.75 D	1.00 D	1.50 D	2.25 D	3.00 D	3.75 D	4.50 D	5.25 D	6.00 D
+22.00 D	0.75 D	1.00 D	1.50 D	2.25 D	3.00 D	3.75 D	4.50 D	5.25 D	6.00 D
+22.50 D	0.75 D	1.00 D	1.50 D	2.25 D	3.00 D	3.75 D	4.50 D	5.25 D	6.00 D
+23.00 D	0.75 D	1.00 D	1.50 D	2.25 D	3.00 D	3.75 D	4.50 D	5.25 D	6.00 D
+23.50 D	0.75 D	1.00 D	1.50 D	2.25 D	3.00 D	3.75 D	4.50 D	5.25 D	6.00 D
+24.00 D	0.75 D	1.00 D	1.50 D	2.25 D	3.00 D	3.75 D	4.50 D	5.25 D	6.00 D
+24.50 D	0.75 D	1.00 D	1.50 D	2.25 D	3.00 D	3.75 D	4.50 D	5.25 D	6.00 D
+25.00 D	0.75 D	1.00 D	1.50 D	2.25 D	3.00 D	3.75 D	4.50 D	5.25 D	6.00 D
+25.50 D	0.75 D	1.00 D	1.50 D	2.25 D	3.00 D	3.75 D	4.50 D	5.25 D	6.00 D
+26.00 D	0.75 D	1.00 D	1.50 D	2.25 D	3.00 D	3.75 D	4.50 D	5.25 D	6.00 D
+26.50 D	0.75 D	1.00 D	1.50 D	2.25 D	3.00 D	3.75 D	4.50 D	5.25 D	6.00 D
+27.00 D	0.75 D	1.00 D	1.50 D	2.25 D	3.00 D	3.75 D	4.50 D	5.25 D	6.00 D
+27.50 D	0.75 D	1.00 D	1.50 D	2.25 D	3.00 D	3.75 D	4.50 D	5.25 D	6.00 D
+28.00 D	0.75 D	1.00 D	1.50 D	2.25 D	3.00 D	3.75 D	4.50 D	5.25 D	6.00 D
+28.50 D	0.75 D	1.00 D	1.50 D	2.25 D	3.00 D	3.75 D	4.50 D	5.25 D	6.00 D
+29.00 D	0.75 D	1.00 D	1.50 D	2.25 D	3.00 D	3.75 D	4.50 D	5.25 D	6.00 D
+29.50 D	0.75 D	1.00 D	1.50 D	2.25 D	3.00 D	3.75 D	4.50 D	5.25 D	6.00 D
+30.00 D	0.75 D	1.00 D	1.50 D	2.25 D	3.00 D	3.75 D	4.50 D	5.25 D	6.00 D
+31.00 D	0.75 D	1.00 D	1.50 D	2.25 D	3.00 D	3.75 D	4.50 D	5.25 D	6.00 D
+32.00 D	0.75 D	1.00 D	1.50 D	2.25 D	3.00 D	3.75 D	4.50 D	5.25 D	6.00 D
+33.00 D				2.25 D	3.00 D	3.75 D	4.50 D	5.25 D	6.00 D
+34.00 D							4.50 D	5.25 D	6.00 D

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