LUXSMART™

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PREMIUM HYDROPHOBIC IOL

For your daily
range of vision

CATARACT LASER RETINA

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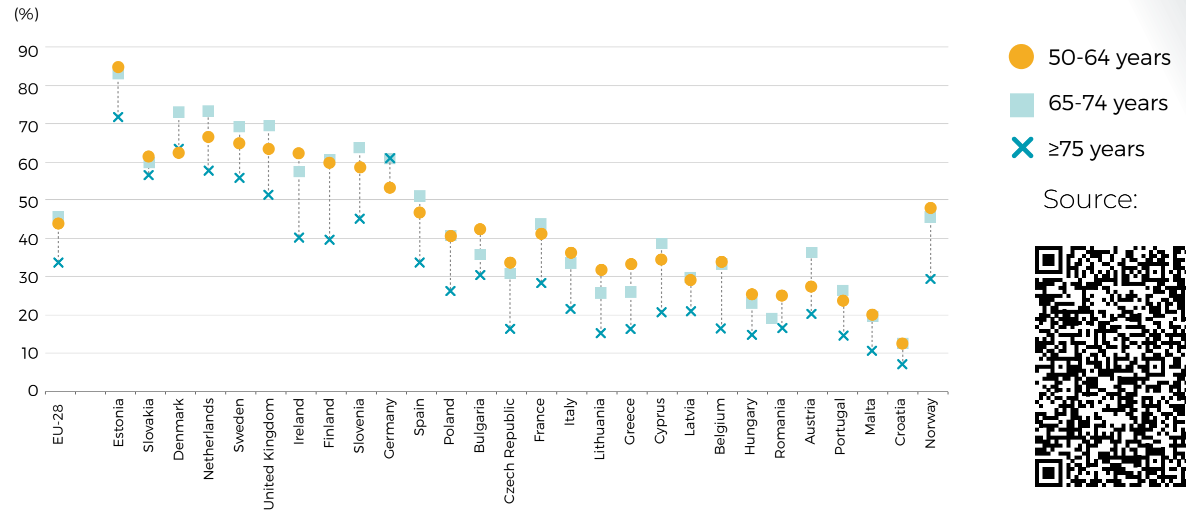
70s ARE THE NEW 40s

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**[1], 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



Source:

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

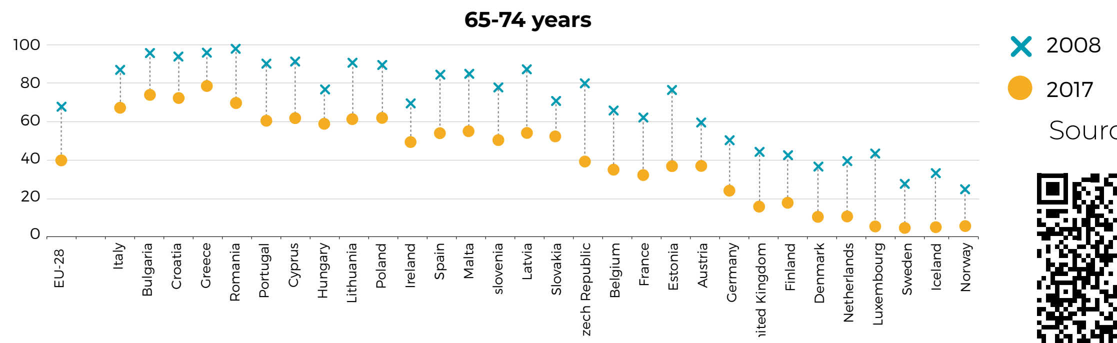


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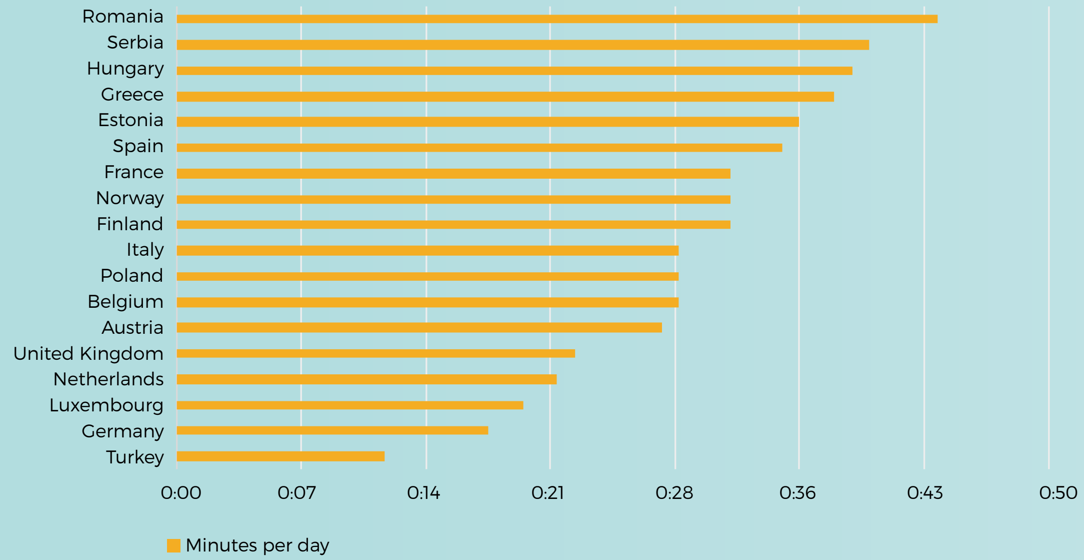
Figure 3. Time spent on shopping and personal services, > 65 years old



Source:

Besides leisure activities, several working distances are also needed for performing other common daily tasks, such as cooking, seeing the speedometer in a car, or walking on uneven ground.

Figure 4. Average time that consumers who cook at home spend cooking each week (hours)

	Germany	France	Italy	United Kingdom	Poland
Total	5.4	5.5	7.1	5.9	6.1
Women	6.5	6.7	8.8	6.3	7.6
Men	4.3	4.2	5.3	5.4	4.5
Aged 15-19	4.1	3.3	4.7	4.3	3.8
Aged 20-29	4.3	4.8	6.9	5.4	5.3
Aged 30-39	5.5	5.1	7.5	5.7	6.5
Aged 40-49	5.4	5.8	7.6	5.9	6.5
Aged 50-59	6.3	6.2	7.5	6.4	9.3
Aged 60 plus	6.4	6.7	7.0	6.5	6.9

Source:

1. 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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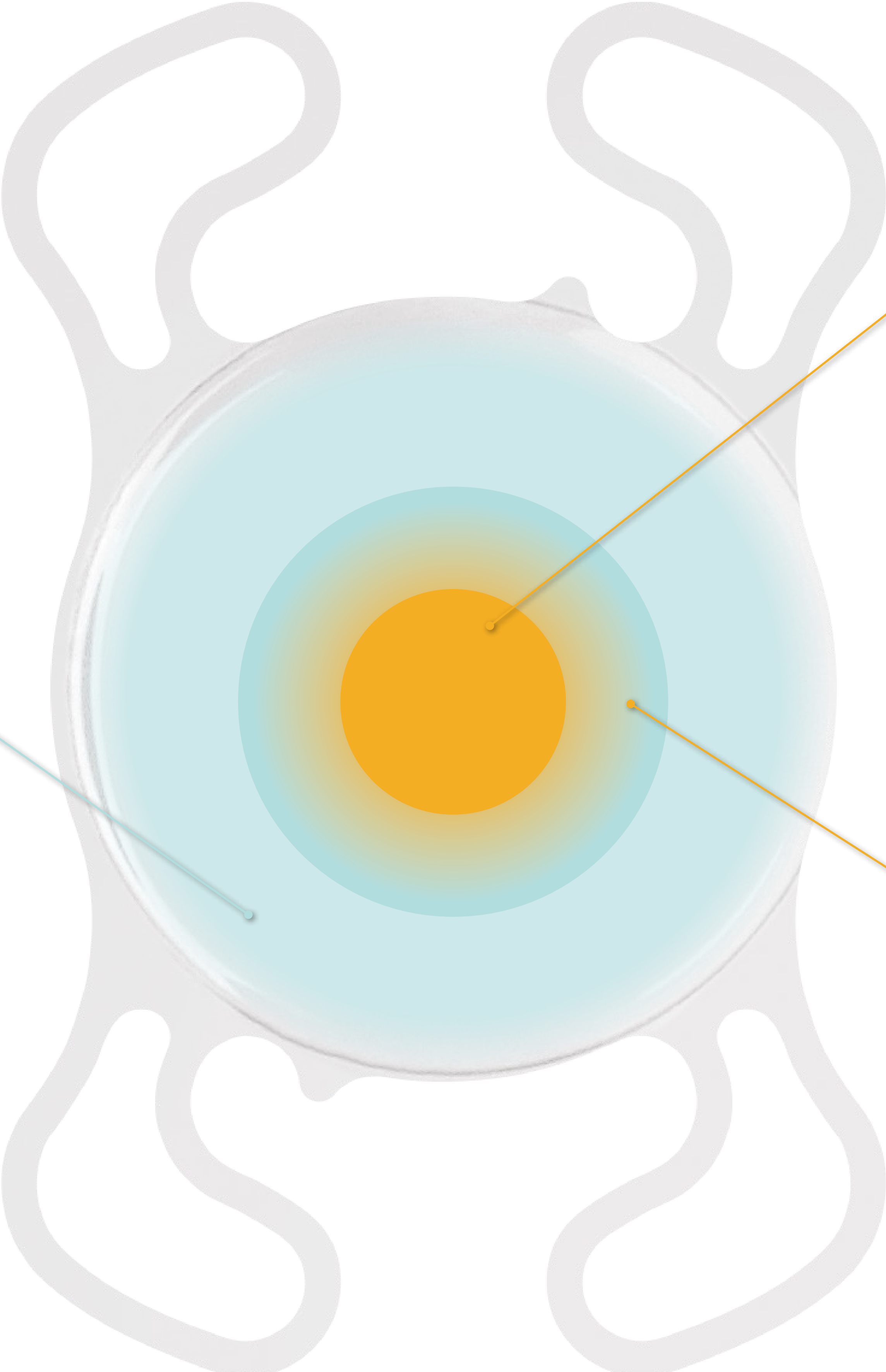
OPTICAL CONCEPT

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

ELONGATED FOCUS CENTER

2 mm center with combination of 4^{th} and 6^{th} 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 4^{th} and 6^{th} 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)

*IOL: Intraocular lens

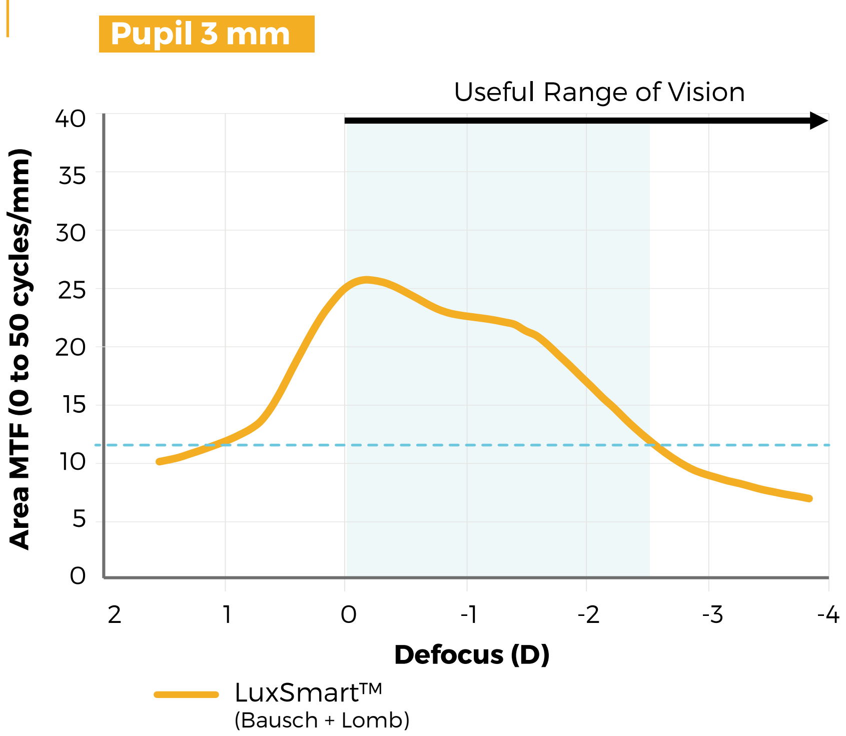
The Area under the Modulation Transfer Function (MTFa) and its relationship with the Visual Acuity

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[2,3,4] 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 5. LuxSmart™ experimental Through-focus MTFa and predicted defocus range[5]



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 6. Depth of Focus comparison of experimental Through-focus MTFa and predicted defocus range for LuxSmart™ (Bausch + Lomb) and Acrysof™ IQ Vivity™ (Alcon)[5]

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

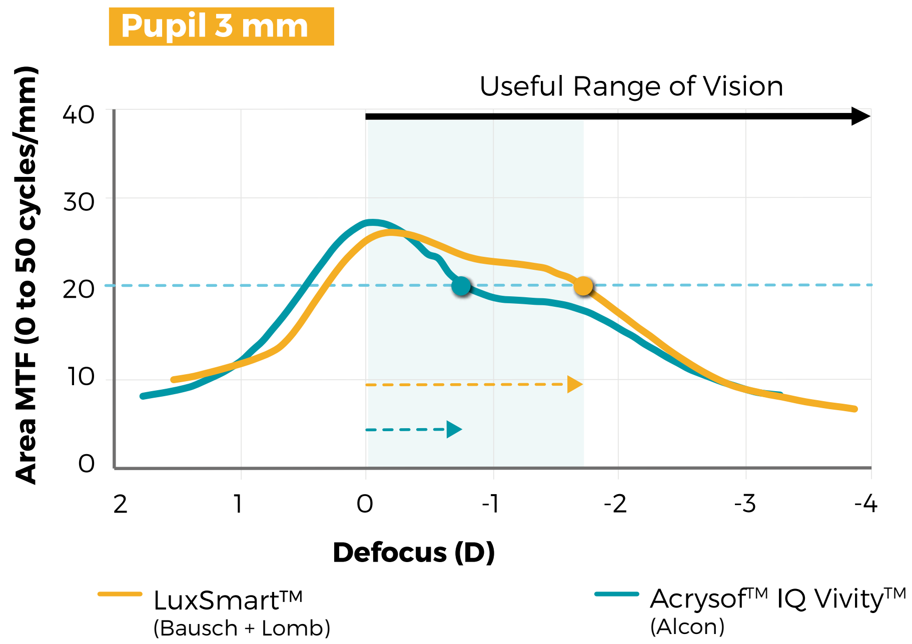
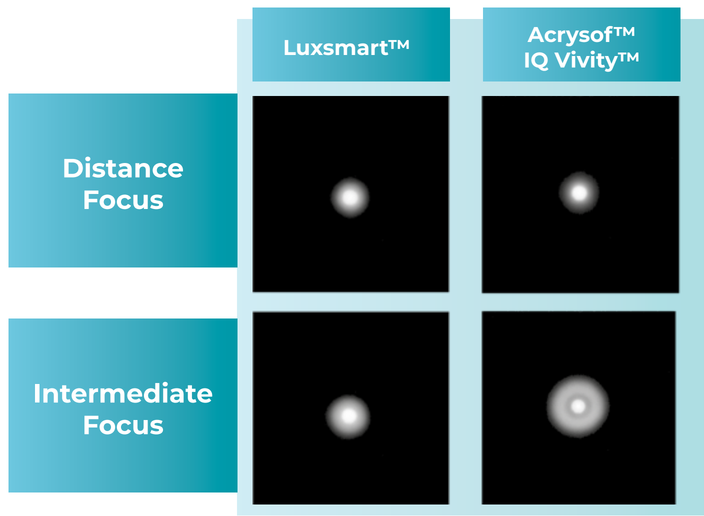


Figure 7. Pinhole images and halos for LuxSmart™ (Bausch + Lomb) and Acrysof™ IQ Vivity™ (Alcon) at distance (top) and intermediate (+1.50 D) focus (bottom) at 4.5 mm pupil. Images are displayed in logarithmic scale for visualization purposes[5]



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

2. 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).
3. Preclinical metrics to predict through-focus visual acuity for pseudophakic patients. A. Alarcon et al. Biomed. Opt. Express 7, 1877-1888 (2016).
4. 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)
5. 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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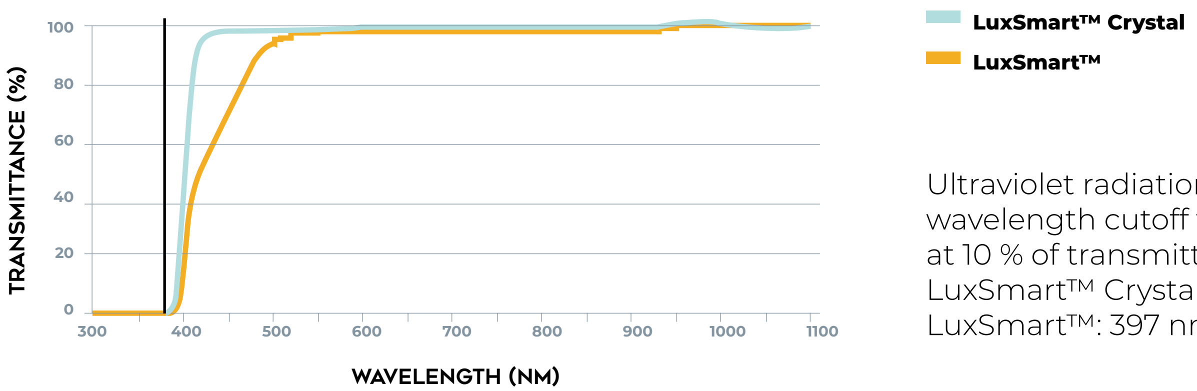
FOR OPTIMIZED EFFECTIVENESS AGAINST PCO*

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.[6]

Nixon and Woodcock[7] 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 8. 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.

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**[8]
- To have similar **postoperative performances in terms of CDVA, inflammation and PCO** compared with the C-loop design[8]
- To have **rotational stability**. 90 % of lenses rotate less than 5 degrees at 6 months[9]
- To be **stable in the eye** and even suitable for the application of a toric surface to correct corneal astigmatism[10]

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

*PCO: Porterior capsule opacification

6. BAUSCH + LOMB data on file: RD-R-015. Measurement of sharp edge.
7. 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

8. 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).
9. 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
10. 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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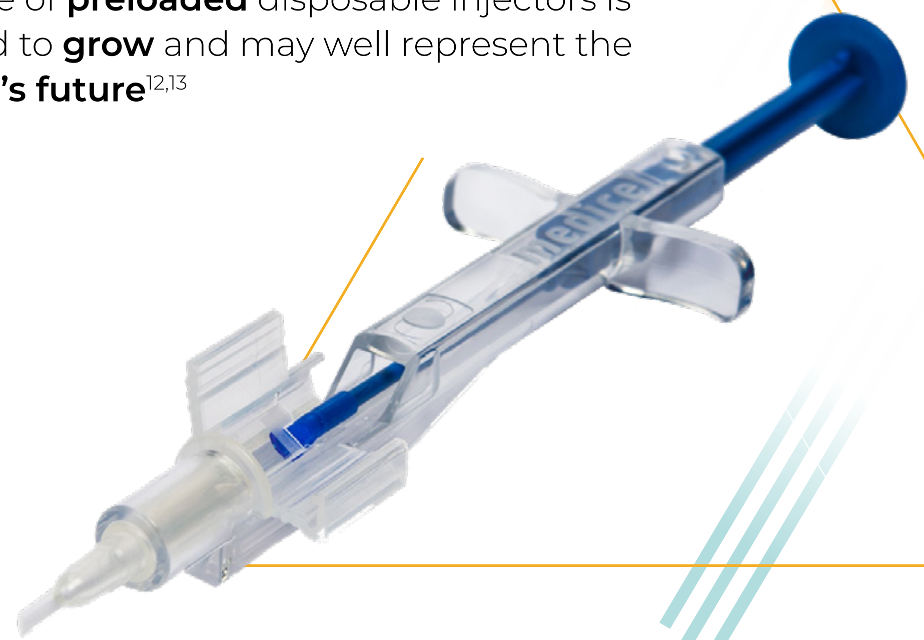
SINGLE STEP FULLY PRELOADED INJECTION

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

- **Less risk of IOL damage and mishandling**[11]
- Usage of preloaded injection systems, which have been shown to produce **faster and more predictable IOL delivery**[11] **with less wound stretching**[12]
- 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**[12,13]



LUXSMART™ LUXSMART™ CRYSTAL

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
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)
Refractive index:	1.54 at 35°
Orientation features:	Top right and bottom left

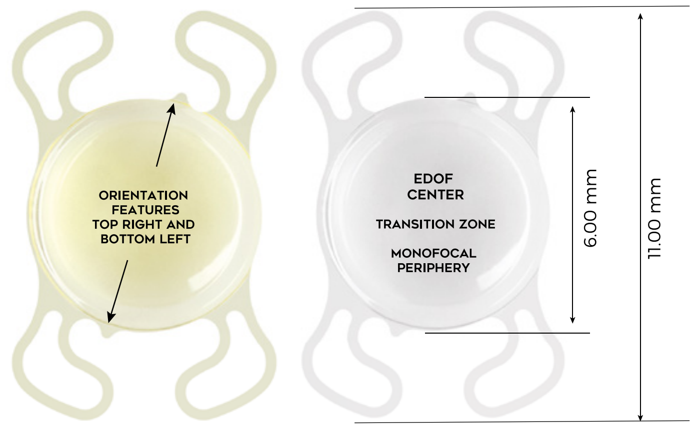
DELIVERY SYSTEM

Fully preloaded system with push injection: Accuject™ Pro
Recommended incision size: ≥ 2.2 mm (wound assisted technique)

CONSTANTS*

OPTICAL CONSTANTS

SRK/T Constant A: 118.5
ACD: 5.23
Surgeon factor: 1.48
Haigis: a_0: 1.045 / a_1: 0.4 / a_1: 0.1
EVO Constant A: 118.5
Barrett: Constant A: 118.4 / Lens Factor: 1.57
Hill-RBF 2.0 Constant A: 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.

11. 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
12. 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
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