HUMANOPTICS

PORTFOLIO

PREMIUM IMPLANTS FOR EYE SURGERY

PRECISION. OUR PROFESSION 3
EXPERTISE FROM EXPERIENCE 4
PREMIUM PORTFOLIO 5
TRIVA 6
TORICA® 7
SAFELOADER® 8
MONOFOCAL SOLUTIONS 9
ASPIRA-aXA 10
ASPIRA-aA 11
CUSTOM*FLEX*® ARTIFICIAL*IRIS* 12
ACCESSORIES 13
CONTACT 14
REFERENCES 15

HumanOptics develops, manufactures and sells premium intraocular implantable solutions.

Our goal is to create the conditions for restoring the best possible vision to patients to improve their quality of life. We achieve that by offering a broad, highly innovative product portfolio – from standard cataract lenses and premium products to individual custom-made solutions – this enables us to meet the most diverse requirements of surgeons and patients.

INNOVATIVE ENGINEERING | SNR TECHNOLOGY | CUSTOMER SERVICE | PREMIUM QUALITY

Strength in innovation, together with outstanding technical precision (Sub-nano resolution technology), maximum quality awareness, and individual customer orientation are the guiding principles that we as a company are committed to – and that for over four decades.

INNOVATIVE ENGINEERING

INNOVATION FROM COOPERATION

- Continuous development of our product portfolio
- Close cooperation with surgeons, medical specialists and users
- Research and joint projects with scientific groups, institutes, and universities

Highly innovative products for best-in-class solutions

PREMIUM QUALITY

100% MADE IN GERMANY

- All business and manufacturing processes take place in Germany: Full control across the whole process
- Multiple 100% inspections: Product quality of each individual IOL is checked and approved multiple times
- TÜV-certified quality management (EN ISO 13485:2016) and certifications worldwide: CE, NMPA, U.S. FDA

100% Made in Germany in accordance with the strictest standards of quality management

SNR TECHNOLOGY

PRECISION IN A NEW DIMENSION

- Leading-edge technology with sub-nano accuracy for extremely defined optical surfaces for clear, brilliant, and sharp images
- High-precision processing of the optical surface by ultra-precision lathes and natural diamonds
- Accelerated processes for the highest quality and product safety

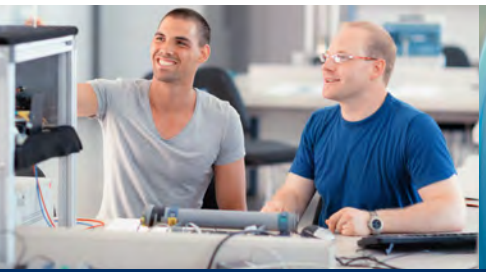
Premium quality optical surface for brilliant, clear, and sharp images

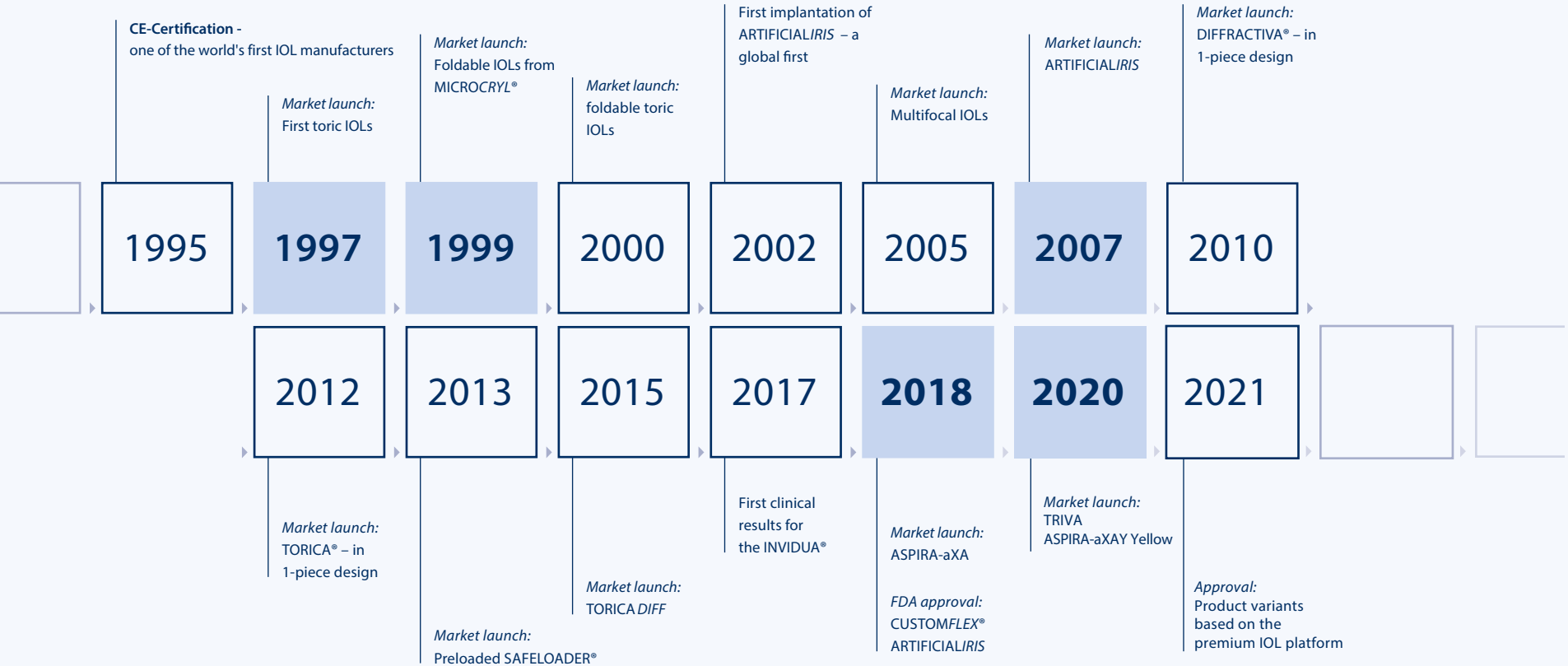
CUSTOMER SERVICE

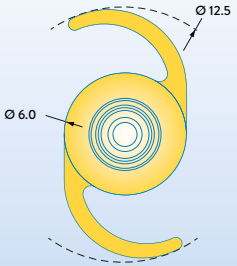
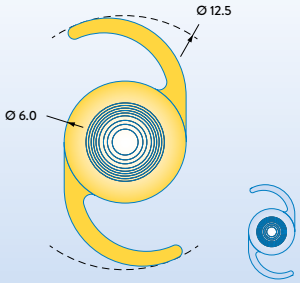
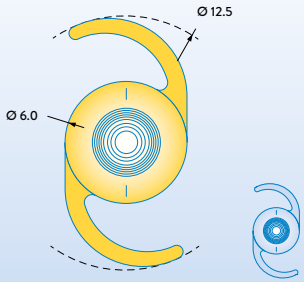
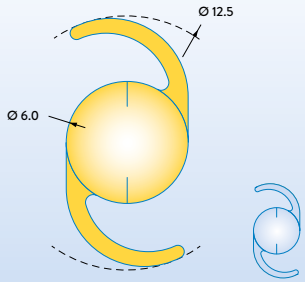
OUR EXPERTS – 100% KNOW-HOW

- Competent consultation for all aspects of our product portfolio
- On-site and surgery support by our experienced sales representatives
- Individual IOL calculation by our application experts

Benefit from our experts' know-how for your precise, individual IOL calculation





1995
CE-Certification -
one of the world's first IOL manufacturers
1997
Market launch:
First toric IOLs
1999
Market launch:
Foldable IOLs from
MICRO*CRYL*®
2000
Market launch:
foldable toric
IOLs
2002
First implantation of
ARTIFICIAL*IRIS* – a
global first
2005
Market launch:
Multifocal IOLs
2007
Market launch:
ARTIFICIAL*IRIS*
2010
Market launch:
DIFFRACTIVA® – in
1-piece design
2012
Market launch:
TORICA® – in
1-piece design
2013
Market launch:
Preloaded SAFELOADER®
2015
Market launch:
TORICA *DIFF*
2017
First clinical
results for
the INVIDUA®
2018
Market launch:
ASPIRA-aXA
FDA approval:
CUSTOM*FLEX*®
ARTIFICIAL*IRIS*
2020
Market launch:
TRIVA
ASPIRA-aXAY Yellow
2021
Approval:
Product variants
based on the
premium IOL platform

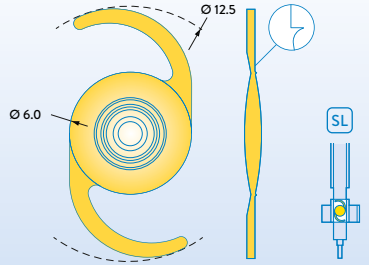
	TRIVA-aAY YELLOW SL	DIFF-aAY YELLOW SL DIFF-aA	TORICA*DIFF*-aAY YELLOW SL TORICA*DIFF*-aA	TORICA-aAY YELLOW TORICA-aA
				
Type	**Trifocal** posterior chamber IOL, one-piece, foldable, blue-light protection	**Multifocal** posterior chamber IOL, one-piece, foldable, blue-light protection optional	**Toric multifocal** posterior chamber IOL, one-piece, foldable, blue-light protection optional	**Toric** posterior chamber IOL, one-piece, foldable, blue-light protection optional
Optic diameter	6.0 mm	6.0 mm	6.0 mm	6.0 mm
Total diameter	12.5 mm	12.5 mm	12.5 mm	12.5 mm
Material	Hydrophilic acrylic with UV-absorber, glistening-free	Hydrophilic acrylic with UV-absorber, glistening-free	Hydrophilic acrylic with UV-absorber, glistening-free	Hydrophilic acrylic with UV-absorber, glistening-free
Optic features	Central diffractive aspheric anterior surface with a refractive optic periphery, aberration-free, 360° lens epithelial cell barrier, intermediate addition +1.75 D[1], near addition +3.5 D[1]	Central diffractive aspheric anterior surface with a refractive optic periphery, aberration-free, 360° lens epithelial cell barrier, near addition +3.5 D[1]	Central diffractive anterior surface with a refractive optic periphery, toric, aspheric posterior surface, aberration-free, 360° lens epithelial cell barrier, near addition +3.5 D[1]	Toric aspheric anterior surface, omnidirectional aberration-free, 360° lens epithelial cell barrier
Haptic design	C-loop	C-loop	C-loop	C-loop
A-constants	Please use for calculation only optimized constants. Constants should be individualized subsequently per surgeon. For more details, please visit www.humanoptics.com			
XL diopter range	**10.0** to **30.0** in 0.5 D steps	**10.0** to **30.0** in 0.5 D steps	Sph: **10.0** to **30.0** in 0.5 D steps Cyl: **1.0** to **6.0** in 0.5 D steps	SE: **-20.0** to **60.0** in 0.5 D steps Cyl: **1.0** to **30.0** in 0.5 D steps (-20.5 D ≤ Meridian ≤ 60.5 D)

[1] at IOL plane

TRIVA

RESILIENT PRESBYOPIA CORRECTION

For patients who want to gain independence from glasses – optimized for the requirements in a digital environment.



THE NEW TRIFOCALITY

- Extended focal range for a continuous vision at all distances
- Optimized for the visual requirements in a digital environment
- Resilient performance through smart IOL technology

TRIPPLE ADVANTAGE

Smart optic technology for less photic phenomena

- Diffractive element with only seven rings at full visual acuity
- High monofocal percentage of the optic surface

Wide range of applications thanks to high performance stability

- Aberration-free optic design is largely tolerant to decentration[2]
- Less Kappa angle (chord length µ) impact[2,3]
- Less dependent on the spherical aberration of the cornea

Physiological material

- Glistening-free with excellent uveal biocompatibility
- Low refractive index for less scattering of light[4]

TRIFOCAL CONTINUUM

RESILIENT EFFECT

ROUTINE THROUGH EXPERIENCE

Type	**Trifocal** posterior chamber IOL, one-piece, foldable, blue-light protection
Optic diameter	6.0 mm
Total diameter	12.5 mm
Material	Hydrophilic acrylic with UV-absorber, glistening-free
Optic features	Central diffractive aspheric anterior surface with a refractive optic periphery, aberration-free, 360° lens epithelial cell barrier, intermediate addition +1.75 D[1], near addition +3.5 D[1]
Haptic design	C-loop
XL diopter range	**10.0** to **30.0** in 0.5 D steps

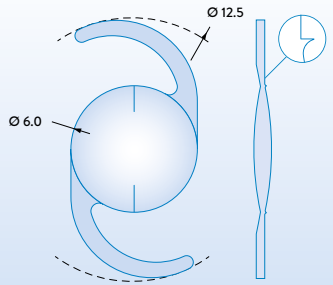
SL

The new trifocality.

TORICA®

PRECISE ASTIGMATISM CORRECTION

For the highest accuracy in astigmatism correction
and maximum imaging quality for your patients – permanently.



RELY ON A PERFORMANCE-STABLE IOL DESIGN

Omnidirectional aspheric

- 360° over the entire surface 100% aberration-free
- Pupil-independent, continuous, stable refractive correction in all meridians

Proven high rotational stability[5]

- Only 1.81° ± 1.87° mean IOL rotation 1.5 years postoperatively (n=40)

Unanimous patient satisfaction[5]

- 100% of the study participants would decide again for the implantation of the TORICA-aA/-aAY

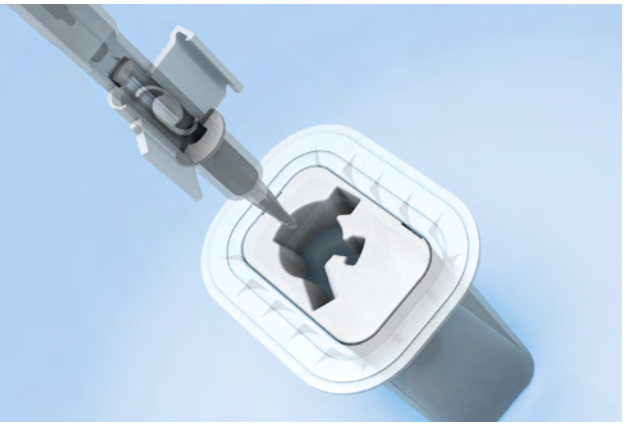
For additional presbyopia correction: TORICA DIFF

XL-DELIVERY RANGE IN 0.5 D STEPS

Choose from more than **8.000 combinations** for an ideal astigmatism correction.
The **0.5 D steps** for SE and cylinder enable an optimum treatment for each patient.

Type	**Toric** posterior chamber IOL, one-piece, foldable, blue-light protection optional
Optic diameter	6.0 mm
Total diameter	12.5 mm
Material	Hydrophilic acrylic with UV-absorber, glistening-free
Optic features	Toric aspheric anterior surface, omnidirectional aberration-free, 360° lens epithelial cell barrier
Haptic design	C-loop
XL diopter range	SE: **-20,0** to **60,0** in 0.5 D steps Cyl: **1.0** to **30.0** in 0.5 D steps (-20.5 D ≤ Meridian ≤ 60.5 D) Extended diopter range on request

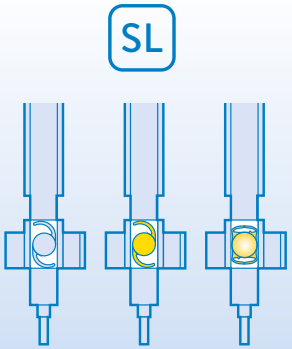
TORICA® – a convincing lens design.



SAFELOADER®

INTUITIVE. SIMPLE. FAST.

The preloaded implantation system for a relaxed IOL implantation:
precise and reliable supply of the IOL.



A SYSTEM FOR HIGH REQUIREMENTS

The contactless preloaded implantation system offers a maximum of safety combined with its intuitive handling for minimally invasive implantations

- Precise and reliable supply of the IOL
- Supports a fast, efficient surgical routine through intuitive, easy handling
- Maximum safety through separate components:
  separate storage of IOL and injector system for optimum sterilization processes

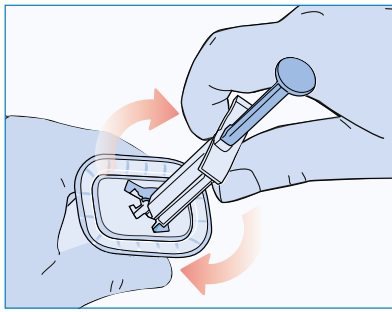
Available in preloaded SAFELOADER®

MONOFOCAL SOLUTIONS

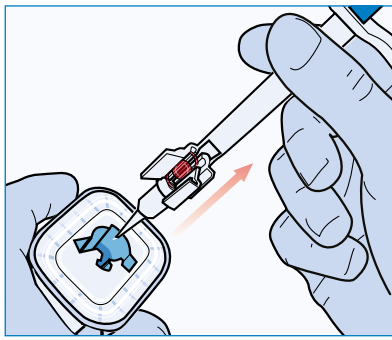
- ASPIRA-aA/-aAY
- ASPIRA-aXA/-aXAY

PREMIUM IOL PLATFORM

- TRIVA-aAY
- DIFF-aA/-aAY
- TORICA*DIFF*-aA/-aAY

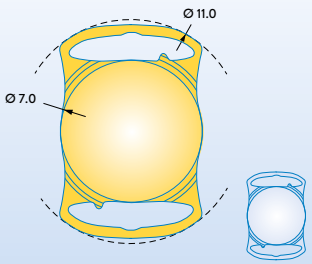
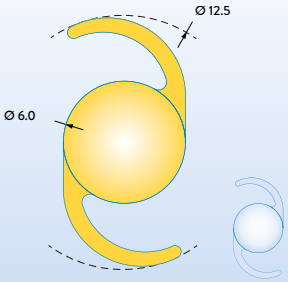
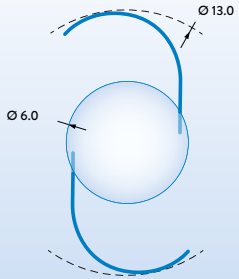
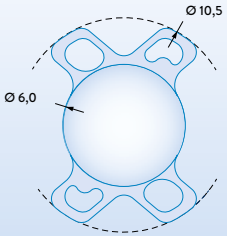
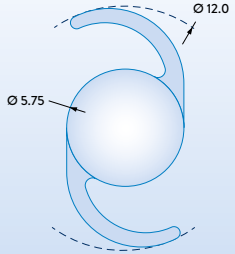


Insert injector;
turn to the right



Remove loaded injector,
close cartridge

Instantly ready to use.

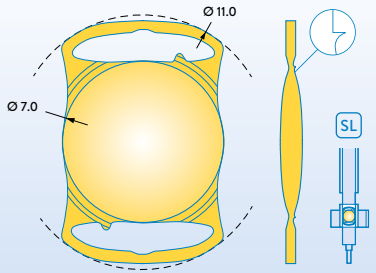
	ASPIRA-aXAY YELLOW SL ASPIRA-aXA	ASPIRA-aAY YELLOW SL ASPIRA-aA	ASPIRA® 3P-aVA	ASPIRA-aQA	AS
					
Type	**Monofocal** posterior chamber IOL, one-piece, foldable, blue-light protection optional	**Monofocal** posterior chamber IOL, one-piece, foldable, blue-light protection optional	**Monofocal** posterior chamber IOL, three-piece, foldable	**Monofocal** posterior chamber IOL, one-piece, foldable	**Monofocal** posterior chamber IOL, one-piece, foldable
Optic diameter	7.0 mm	6.0 mm	6.0 mm	6.0 mm	5.75 mm
Total diameter	11.0 mm	12.5 mm	13.0 mm	10.5 mm	12.0 mm
Material	Hydrophilic acrylic with UV-absorber, glistening-free	Hydrophilic acrylic with UV-absorber, glistening-free	Optic: hydrophilic acrylic with UV-absorber, glistening-free Haptics: PES, blue	Hydrophilic acrylic with UV-absorber, glistening-free	Hydrophilic acrylic with UV-absorber, glistening-free
Optic features	XL optic, aspheric anterior surface, aberration-free, 360° lens epithelial cell barrier	Aspheric anterior surface, aberration-free, 360° lens epithelial cell barrier	Aspheric posterior surface, aberration-free, 360° sharp posterior edge	Aspheric anterior surface, aberration-free, 360° lens epithelial cell barrier	Spheric anterior and posterior surface
Haptic design	Cut-out haptics	C-loop	C-loop	Quattro haptics	C-loop
A-constants	Please use for calculation only optimized constants. Constants should be individualized subsequently per surgeon. For more details, please visit www.humanoptics.com				
XL diopter range	Preloaded in SAFELOADER® **10.0** to **30.0** in 0.5 D steps In COMPACT LINE | ASPIRA-aXA **-10.0** to **9.0** in 1.0 D steps **10.0** to **30.0** in 0.5 D steps	**–20.0** to **60.0** in 1.0 D steps **10.0** to **30.0** in 0.5 D steps	**10.0** to **30.0** in 0.5 D steps	**0.0** to **30.0** in 1.0 D steps **10.0** to **30.0** in 0.5 D steps	**0.0** to **9.0** in 1.0 D steps **10.0** to **30.0** in 0.5 D steps

New:
ASPIRA-aXAY
with blue-light
protection

ASPIRA-aXA/-aXAY

VISION WITHOUT LIMITS

The XL optic design provides optimal conditions
for pseudophakic reliability for you and your patients.



MORE THAN A CONVENTIONAL IOL

XL optic, XS incision

The XL optic design of the posterior chamber IOL with its extended optic diameter of 7.0 mm

- allows an enlarged view into the outermost fundus periphery
- is a promising approach to avoid dysphotopsia

and permits implantation through small incisions.

THE ROUTINE REMAINS

XL easy, XS stress

- Astigmatism-neutral implantation convenient through small incisions
- Precise and reliable supply of the IOL by preloaded SAFELOADER® autoloading system
- Intuitive, easy handling for a quick and efficient surgical routine

ASPIRA-aXA/-aXAY

Provides the solution

A custom solution for the most diverse needs:

- For standard cataract surgery
- In refractive surgery
- For combined procedures in vitreo-retinal surgery

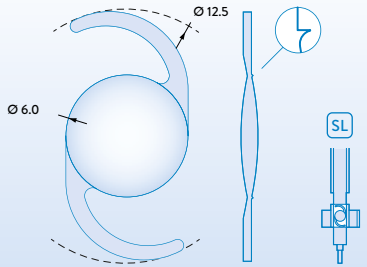
Type	**Monofocal** posterior chamber IOL, one-piece, foldable, blue-light protection optional
Optic diameter	7.0 mm
Total diameter	11.0 mm
Material	Hydrophilic acrylic with UV-absorber, glistening-free
Optic features	XL optic, aspheric anterior surface, aberration-free, 360° lens epithelial cell barrier
Haptic design	Cut-out haptics
XL diopter range ASPIRA-aXA	Preloaded in SAFELOADER® SL **10.0** to **30.0** in 0,5 D steps In Compact Line -10.0 to 9.0 in 1.0 D steps 10.0 to 30.0 in 0.5 D steps
XL diopter range ASPIRA-aXAY	Preloaded in SAFELOADER® SL **10.0** to **30.0** in 0.5 D steps

Pseudophakic reliability for you and your patients.

ASPIRA®

PREMIUM IS OUR STANDARD

Monofocal capsular bag lens with all the advantages of a premium IOL.



MONOFOCAL PREMIUM IOL

Benefit from the advantages of our premium platform

- Aspheric, aberration-free optic design for improved contrast sensitivity
- XL delivery range
- MICS – for astigmatism-neutral implantations
- Optionally preloaded in SAFELOADER® or space-saving in COMPACT LINE
- Optionally with blue-light protection
- Sub-nano resolution technology: highest precision and accuracy in the production of extremely smooth optical surfaces and IOL designs

OUTSTANDING IOL MATERIAL

Modeled on the natural lens

- Glistening-free
- High Abbe number attests to the outstanding material quality
- Low refractive index

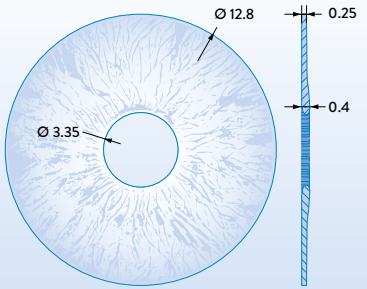
Type	**Monofocal** posterior chamber IOL, one-piece, foldable, blue-light protection optional
Optic diameter	6.0 mm
Total diameter	12.5 mm
Material	Hydrophilic acrylic with UV-absorber, glistening-free
Optic features	Aspheric anterior surface, aberration-free, 360° lens epithelial cell barrier
Haptic design	C-loop
XL diopter range	**–20.0** to **60.0** in 1.0-D steps **10.0** to **30.0** in 0.5 D steps Also preloaded in SAFELOADER®, diopter range may differ SL

Expertise from experience.

CUSTOM*FLEX*® ARTIFICIAL*IRIS*

PREMIUM RESULTS FOR PATIENTS WITH ANIRIDIA

Medical and aesthetic rehabilitation for your patients with complete and partial aniridia.



Total diameter 12.8 mm

Pupil diameter 3.35

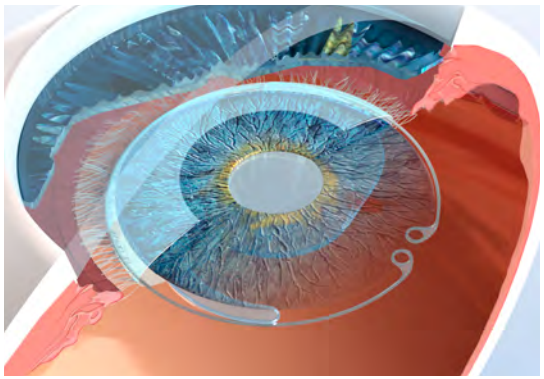
Two models

MEDICAL REHABILITATION

- Reduction of photic phenomena[6]
- Elimination of transillumination defects
- Improved contrast sensitivity[7]

AESTHETIC REHABILITATION

- Custom-made
- Based on the natural structure and personal coloring of the patient's original iris
- Impressively realistic results



Injectable

Conveniently implantable through small incisions (rolled or folded)

Customizable by trephines

Customizable in shape and size to the respective iris defect

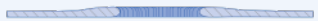
Flexible

Choose the optimum implantation method for your patient and combine the CUSTOM*FLEX*® ARTIFICIAL*IRIS* with your preferred IOL

ARTIFICIAL*IRIS* with Fiber

For treatment of aniridia in cases where suturing is indicated.

ARTIFICIAL*IRIS* Fiber free



For cases without suture fixation. Suture fixation possible with appropriate technique.

VISCOELASTICS/OVD

Our viscoelastic solutions offer efficient, reliable support during your ophthalmic surgery.

Sodium hyaluronate/Bacterial fermentation

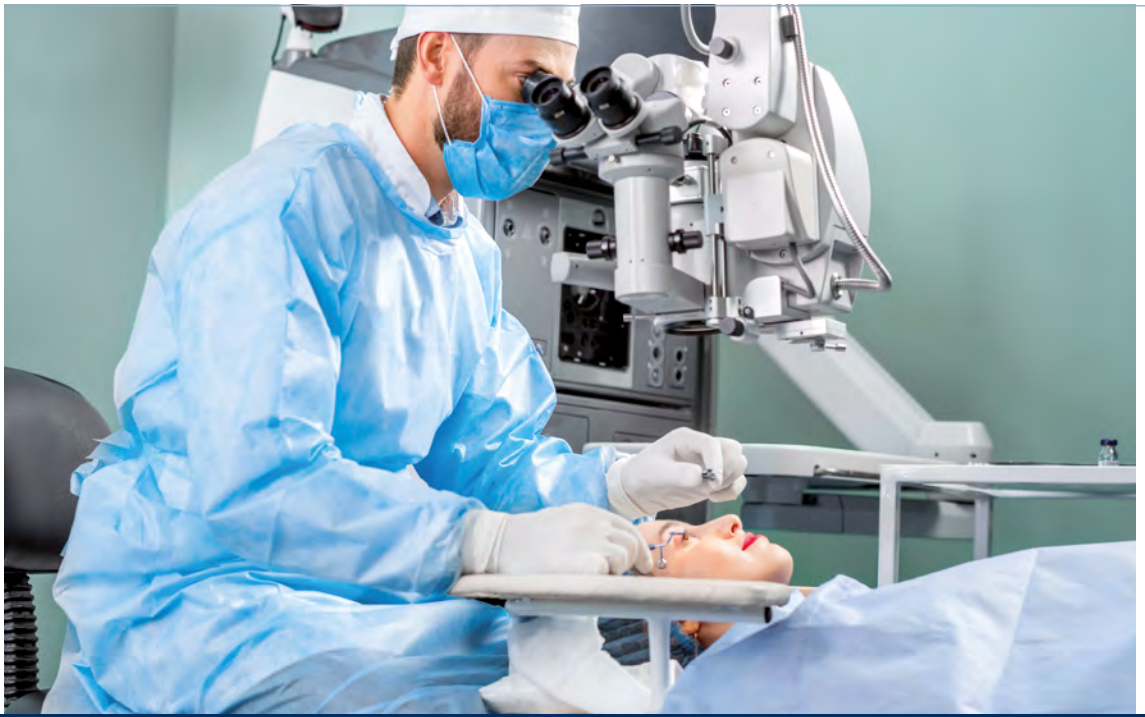
- Naluron 1.4 | Naluron 1.6 | Naluron 1.8
- Pe-Ha-Luron® F 1.0% | Pe-Ha-Luron® F 3.0%
- Pe-Ha-Blue® Plus 1.7%

Sodium hyaluronate/Natural extraction

- Pe-Ha-Luron® 1.0% | Pe-Ha-Luron® Plus 1.4%

Hydroxypropyl methylcellulose (HPMC)

- Visco 2.0
- Pe-Ha-Visco® 2.0 | Pe-Ha-Visco® Plus 2.4
- Pe-Ha-Guard® 2.0%



MICRO*SIL*® DIAPHRAGM – DP 4128

- Pupillary closed diaphragm
- Total diameter: 12.0 mm
- Central transparent zone: 3.5 mm
- Silicone elastomer with embedded polymer meshwork

PREMIUM PRODUCTS – PREMIUM SERVICE

OUR EXPERTS – 100% KNOWHOW

Order from us – quick and easy

Please contact your local HumanOptics distributor or our Customer Service to get in touch with our distribution partners.

Direct contact to
our customer service

customerservice@humanoptics.com

Follow us on social media!

YouTube LinkedIn

Premium service plus expertise

Take advantage of our individual application and calculation service. Our experts will assist you to find the optimum implant for your patient.

Always there for you

Our customer service is at your disposal for consultations. Whether by e-mail, telephone or digitally via videochat – we are there for you.

Well informed at a glance

From now on you will receive current information about our products also on LinkedIn. Visit our company profile. We look forward to networking with you!

CUSTOMER SERVICE

HumanOptics Holding AG · Spardorfer Str. 150 · 91054 Erlangen · Germany · Tel. +49 (0) 9131 50 66 5-0 · Fax +49 (0) 9131 50 66 5-90 · mail@humanoptics.com

V7.0/2021-06

REFERENCES

The word "aberration" as used in this document refers to spherical aberration.

[1] at IOL plane

[2] Eppig, T, et al. (2009). Effect of decentration and tilt on the image quality of aspheric intraocular lens designs in a model eye. J Cataract Refract Surg, 35:1091-1100.

[3] Garzón, N, et al. (2020). Influence of angle k on visual and refractive outcomes after implantation of a diffractive trifocal intraocular lens. J Cataract Refract Surg, 46:721-727.

[4] Erie, J, et al. (2001). Analysis of postoperative glare and intraocular lens design. J Cataract Refract Surg, 27:614-621.

[5] Gyöngyössy B, Jirak P, Schönherr U. Long-term rotational stability and visual outcomes of a single-piece hydrophilic acrylic toric IOL: a 1.5-year follow-up. Int J Ophthalmol. 2017 Apr 18;10(4):573-578.

[6] Mayer C, Reznicek L, Hoffmann A. Pupillary Reconstruction and Outcome after Artificial Iris Implantation. American Academy of Ophthalmology. 2016 May; 123(5):1011-1018.

[7] Data on file: www.clinicaltrials.gov/ct2/show/NCT01860612?term=NCT01860612& (Access: 24.06.2020).