



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/-aXAY	10
ASPIRA-aA/-aAY.....	11
CUSTOMFLEX® ARTIFICIALIRIS.....	12
VISCOELASTIC SOLUTIONS / OVD	13
OUR PREMIUM SERVICE	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**



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**



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**

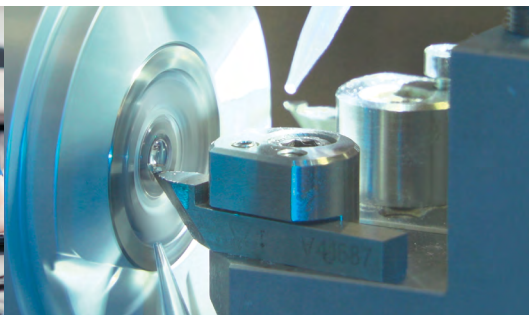


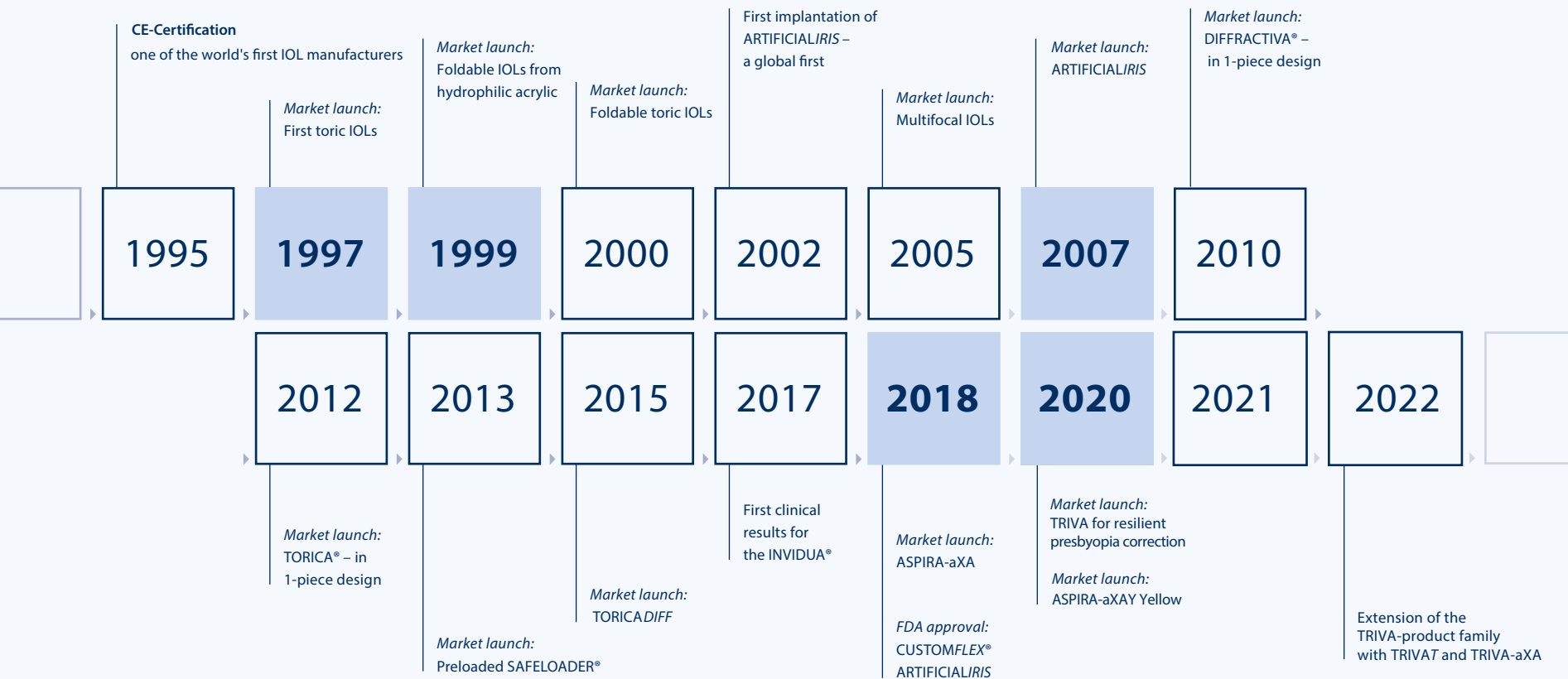
CUSTOMER
SERVICE

OUR EXPERTS – 100% KNOW-HOW

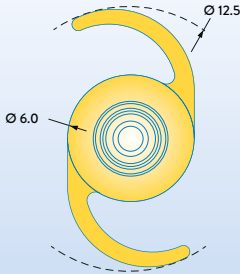
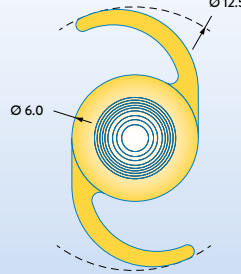
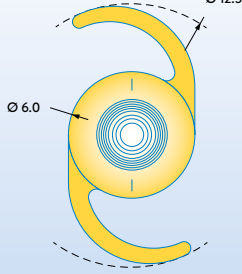
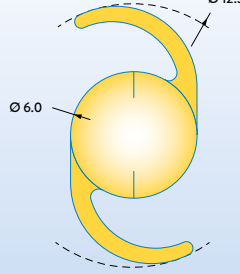
- Competent consultation for all aspects of our product portfolio
- On-site and surgery support by our experienced sales representatives
- Individual IOL calculation by our application experts

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





PREMIUM IOL PLATFORM

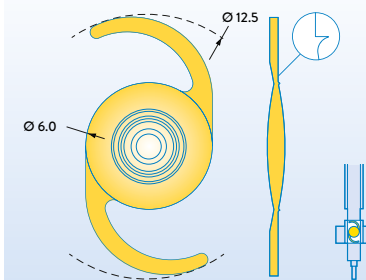
	TRIVA-aAY YELLOW SL	DIFF-aAY YELLOW DIFF-aA	TORICADIFF-aAY YELLOW SL TORICADIFF-aA	TORICA-aAY YELLOW TORICA-aA
				
Type	Trifocal posterior chamber IOL, one-piece, foldable, blue-light protection	Multifocal posterior chamber IOL, one-piece, foldable, blue-light protection optional	Toric multifocal posterior 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 bis 60.0 in 0.5 D steps Cyl.: 1.0 bis 20.0 in 0.5 D steps

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.



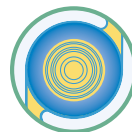
THE NEW TRIFOCALITY

- 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

RESILIENT PRESBYOPIA CORRECTION

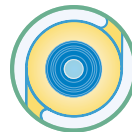
Balanced light distribution²

- Generous monofocal optical periphery
- Enhances distance vision under mesopic conditions



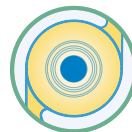
Reduces photic phenomena³

- Diffractive optical element (DOE) reduced to 7 rings
- Small DOE surface share of just Ø 3.5 mm



Extended decentration tolerance^{4, 5, 6, 7}

- Wide kappa zone
- Aberration-free optic



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 D¹,
near addition +3.5 D¹

Haptic design

C-loop

XL diopter range

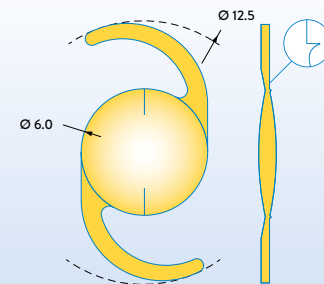
10.0 to 30.0 in 0.5 D steps

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
- Choose from over **5,500 combinations** for ideal astigmatism correction

Proven high rotational stability⁸

- Only $1.81^\circ \pm 1.87^\circ$ mean IOL rotation 1.5 years postoperatively (n = 28)

Unanimous patient satisfaction⁸

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

XL-DELIVERY RANGE IN 0.5 D STEPS

- The 0.5 D graduations for SE and cylinder enable optimal treatment for every 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 20.0 in 0.5 D steps

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

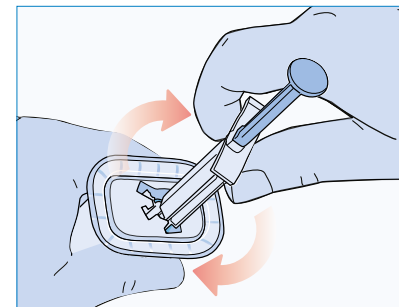
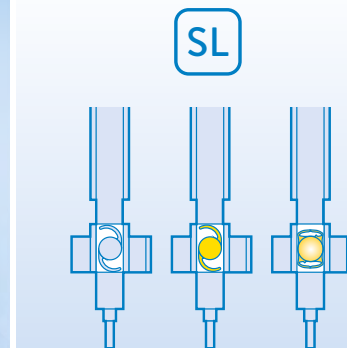
Available in preloaded SAFELOADER®

MONOFOCAL SOLUTIONS

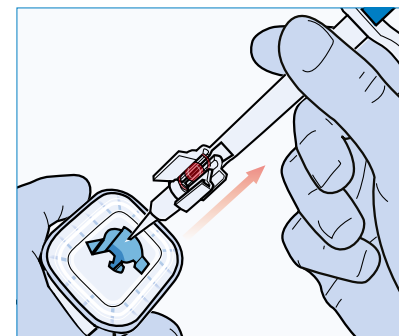
- ASPIRA-aA/-aAY
- ASPIRA-aXA/-aXAY

PREMIUM IOL PLATFORM

- TRIVA-aAY
- TORICADIFF-aA/-aAY



Insert injector;
turn to the right



Remove loaded injector,
close cartridge

Instantly ready to use.



MONOFOCAL SOLUTIONS

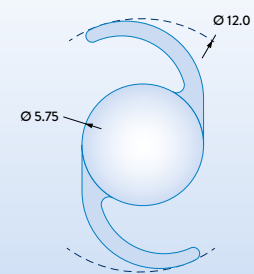
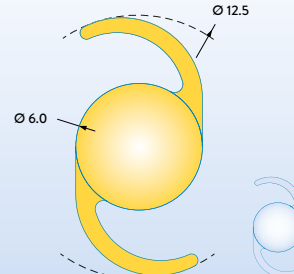
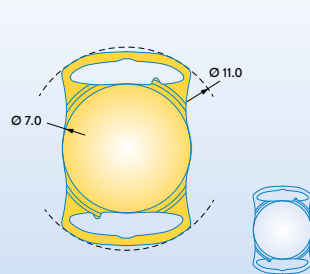
ASPIRA-aXAY **YELLOW**
ASPIRA-aXA

SL

ASPIRA-aAY **YELLOW**
ASPIRA-aA

SL

AS

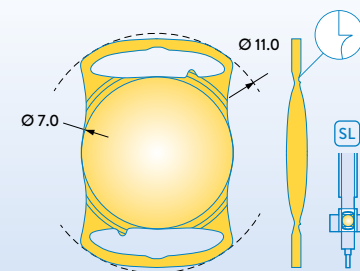


Type	Monofocal posterior chamber IOL, one-piece, foldable, blue-light protection optional		Monofocal posterior chamber IOL, one-piece, foldable, blue-light protection optional
Optic diameter	7.0 mm		6.0 mm
Total diameter	11.0 mm		12.5 mm
Material	Hydrophilic acrylic with UV-absorber, glistening-free		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
Haptic design	Cut-out 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 30.0 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 Deviating delivery area for provision preloaded in the SAFELOADER®

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
- reduces the occurrence of dysphotopsia⁹ and enables implantation through small incisions

THE ROUTINE IS UNCHANGED

XL easy, XS stress

- Astigmatism-neutral implantation convenient through small incisions
- Precise and reliable supply of the IOL in a preloaded SAFELOADER[®] autoloading system
- Intuitive, simple handling for a quick and efficient OR 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-aXAY

Preloaded in SAFELOADER[®]
10.0 to 30.0 in 0.5 D steps

XL diopter range
ASPIRA-aXA

Preloaded in SAFELOADER[®]
10.0 to 30.0 in 0.5 D steps

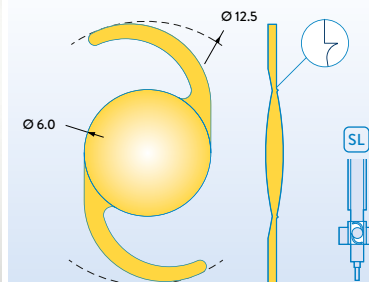
In COMPACT LINE
-10.0 to 30.0 in 1.0 D steps
10.0 to 30.0 in 0.5 D steps

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

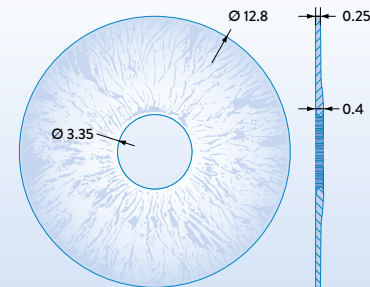
Type	Monofocal posterior chamber IOL, one-piece, foldable, blue-light protection optional
Optic diameter	6.0 mm
Total diameter	12.5 mm
Material	Hydrophilic acrylic with UV-absorber, glistening-free
Optic features	Aspheric anterior surface, aberration-free, 360° lens epithelial cell barrier
Haptic design	C-loop
XL diopter range	Preloaded in SAFELOADER® 10.0 to 30.0 in 0,5 D steps In COMPACT LINE -20.0 to 60.0 in 1.0 D steps 10.0 to 30.0 in 0.5 D steps

Expertise from experience.

CUSTOMFLEX® ARTIFICIALIRIS

PREMIUM RESULTS FOR PATIENTS WITH ANIRIDIA

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

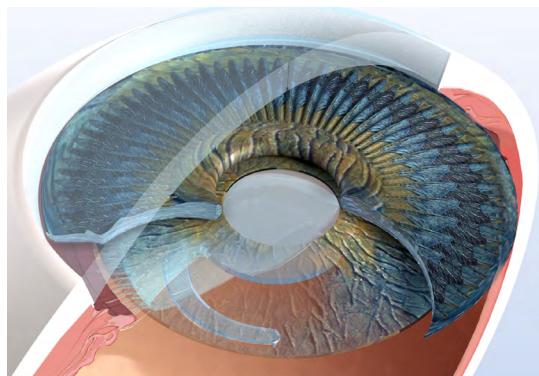


MEDICAL REHABILITATION

- Reduction of photic phenomena¹⁰
- Elimination of transillumination defects
- Improved contrast sensitivity¹¹

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

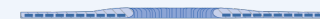
Choose the optimum implantation method for your patient and combine the CUSTOMFLEX® ARTIFICIALIRIS with your preferred IOL

Total diameter 12.8 mm

Pupil diameter 3.35

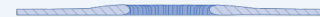
Two models

ARTIFICIALIRIS with Fiber

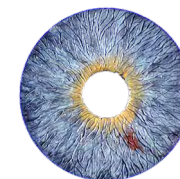


For treatment of aniridia in cases where suturing is indicated.

ARTIFICIALIRIS Fiber free



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



VISCOELASTIC SOLUTIONS / OVD

FOR OPHTHALMIC SURGERY



PE-HA-LURON® F 1.4% | 1.8% | 2.2%

Sterile viscoelastic solution based on

bio-fermented sodium hyaluronate, pH 6.8–7.4

- Preserves a secure and stable anterior chamber during eye surgeries
- Protects the surrounding intraocular tissue during the surgery

PE-HA-LURON® 1.0% | PLUS 1.4%

Sterile viscoelastic solution based on

natural extraction of sodium hyaluronate (Cockscomb), pH 6.8–7.4

- Combines the benefits of cohesive and dispersive OVD
- Maintains the anterior chamber depth and protects the surrounding intraocular tissue of during the surgery

PE-HA-VISCO® 2.0% | PLUS 2.4%

Sterile viscoelastic solution based on

hydroxypropyl methylcellulose pH 6.8–7.5

- Pe-Ha-Visco® stabilizes the anterior chamber and provides reliable endothelial cell protection

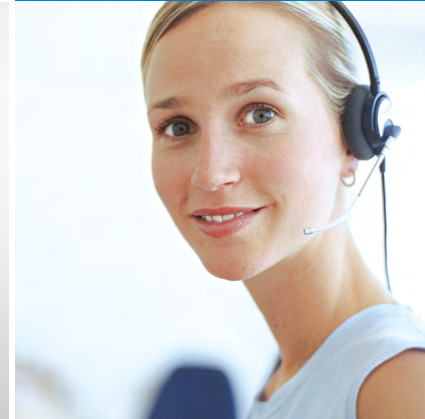
PE-HA-LURON® F	1.4%	1.8%	2.2%
Molecular weight	1.2–2.0 MDa	1.2–2.2 MDa	1.2–2.2 MDa
Viscosity (after steam sterilization)	approx. 30 000 mPas	approx. 100 000 mPas	approx. 150 000 mPas
Osmolality	270-400 mOsm/kg		
Volume (glass syringe with 27G injection needle)	1.0 ml		

PE-HA-LURON®	1.0%	PLUS 1.4%
Molecular weight	5.0 MDa	6.0 MDa
Viscosity (after steam sterilization)	approx. 1 000 000 mPas	approx. 3 300 000 mPas
Osmolality	320 mOsm/kg	
Volumen (glass syringe with 27G injection needle)	0.55 ml 0.85 ml	

PE-HA-VISCO®	2.0%	PLUS 2.4%
Molecular weight	0.07–0.15 MDa	0.10–0.18 MDa
Viscosity (after steam sterilization)	approx. 4 000–5 000 mPas	approx. 6 000–8 000 mPas
Osmolality	270–400 mOsm/kg	
Volumen (glass syringe with 27G injection needle)	2.0 ml	Box of 10 (clinic pack)

PREMIUM PRODUCTS – PREMIUM SERVICE

OUR EXPERTS – 100% KNOWHOW



Order from us – quick and easy

E-MAIL
customerservice@humanoptics.com

Direct contact to
our customer service
+49 (0) 9131 50 66 5-44

Follow us on social media!



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

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

² HumanOptics Holding AG (2022). Data on file.

³ HumanOptics Holding AG (2022). Technical documentation.

⁴ Garzón, N, et al. (2020). Influence of angle κ on visual and refractive outcomes after implantation of a diffractive trifocal intraocular lens. *J Cataract Refract Surg*, 46:721-727.

⁵ 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.

⁶ Grabner, G (2017). Best kept secrets Diffractiva Diff-aA. *Cataract & Refractive Surgery Today Europe* Jan; 52-53.

⁷ Kránitz, K (2017). Aberration profile of two multifocal IOLs and the effect of angle κ on postoperative aberrations, Presented ESCRS, Lisbon.

⁸ 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.

⁹ Bonsemeyer M K, et. al. (2022). Dysphotopsiae and functional quality of vision after implantation of an intraocular lens with a 7.0 mm optic and plate haptic design. *J Cataract Refract Surg*, 48 (1):75

¹⁰ Mayer C, Reznicek L, Hoffmann A. Pupillary Reconstruction and Outcome after Artificial Iris Implantation. *American Academy of Ophthalmology*. 2016 May; 123 (5):1011-1018.

¹¹ Data on file: www.clinicaltrials.gov/ct2/show/NCT01860612?term=NCT01860612& (Access: 24.06.2020).

