HUMANOPTICS

PORTFOLIO

PREMIUM IMPLANTS FOR EYE SURGERY

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

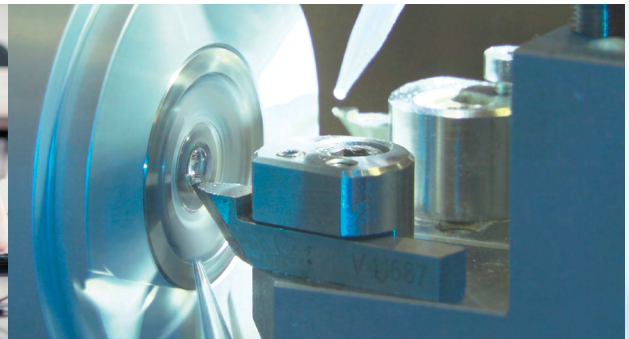
Premium quality optical surface for brilliant, clear, and sharp images

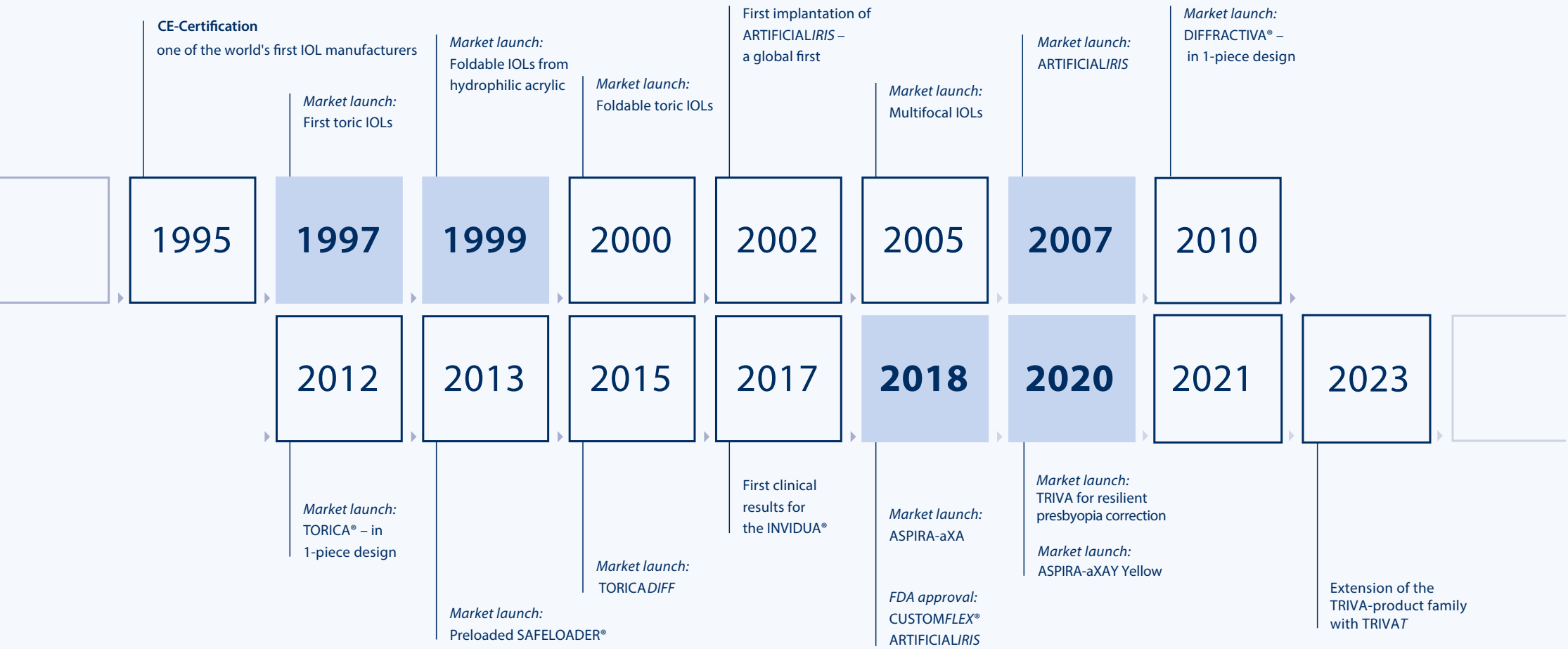
CUSTOMER SERVICE

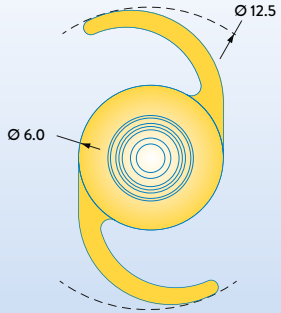
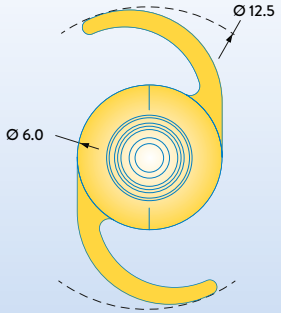
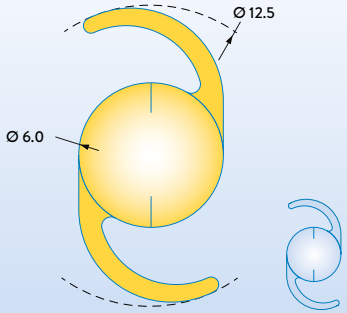
OUR EXPERTS – 100% KNOW-HOW

- 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 hydrophilic acrylic
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 for resilient presbyopia correction
Market launch:
ASPIRA-aXAY Yellow
2021
2023
Extension of the TRIVA-product family with TRIVA*T*

	TRIVA-aAY YELLOW SL	TRIVAT-aAY YELLOW SL	TORICA-aAY YELLOW TORICA-aA
			
Type	**Trifocal** posterior chamber IOL, one-piece, foldable, blue-light protection	**Trifocal-toric** posterior chamber IOL, one-piece, foldable, blue-light protection	**Toric** posterior chamber IOL, one-piece, foldable, blue-light protection optional
Optic diameter	6.0 mm	6.0 mm	6.0 mm
Total diameter	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
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 refractive optic periphery, toric, aspheric posterior surface, omnidirectional, aberration-free, 360° lens epithelial cell barrier, intermediate addition + 1.75 D[1] 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
A-constants	Please use for calculation only optimized constants. Constants should be individualized subsequently per surgeon. For more details, please visit www.humanoptics.com Further constants for the respective IOL model can also be found at www.IOLCon.org		
XL diopter range	**10.0** bis **30.0** in 0.5 D steps	SE: **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 **20.0** in 0.5 D steps

[1] at IOL plane

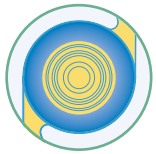
Discover our multifocal premium IOLs - maximum imaging quality for optimal visual acuity

TRIVA
RESILIENT PRESBYOPIA CORRECTION

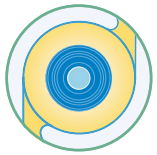
For patients who want to gain independence from glasses:
Continous vision at all distances – optimized for the requirements in a digital environment.

THE NEW TRIFOCALITY

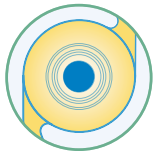
Balanced light distribution[2]
- Generous monofocal optical periphery
- Enhances distance vision under mesopic conditions



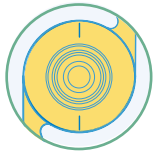
Reduces photic phenomena[3]
- Diffractive optical element (DOE) reduced to 7 rings
- Small DOE surface share of just Ø 3.5 mm



Extended decentration tolerance[4, 5, 6, 7]
- Wide kappa zone
- Aberration-free optic



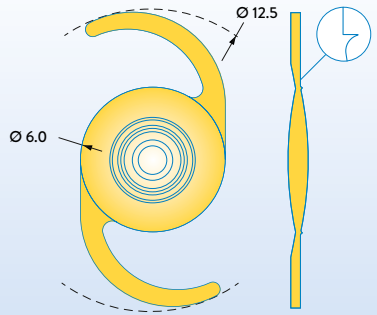
TRIVA*T*: Presbyopia correction for astigmatism
- High rotation stability from experience with the TORICA®
- Omnidirectional aberration-free



NEW:
Now as toric version

The new trifocality.

TRIVA-aAY YELLOW SL



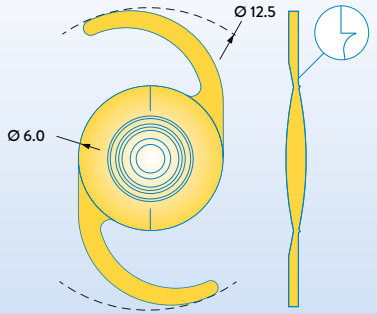
XL delivery range

10.0 to **30.0** in 0.5 D steps

Near addition: +3.5 D[1]

Intermediate addition: +1.75 D[1]

TRIVA*T*-aAY YELLOW SL



XL delivery range

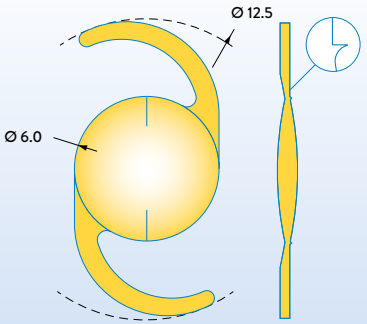
SE: **10.0** to **30.0** in 0.5 D steps
Cyl.: **1.0** to **6.0** in 0.5 D steps

Near addition: +3.5 D[1]

Intermediate addition: +1.75 D[1]

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 stability[8]

- Only 1.81° ± 1.87° mean IOL rotation 1.5 years postoperatively (n = 28)

Unanimous patient satisfaction[8]

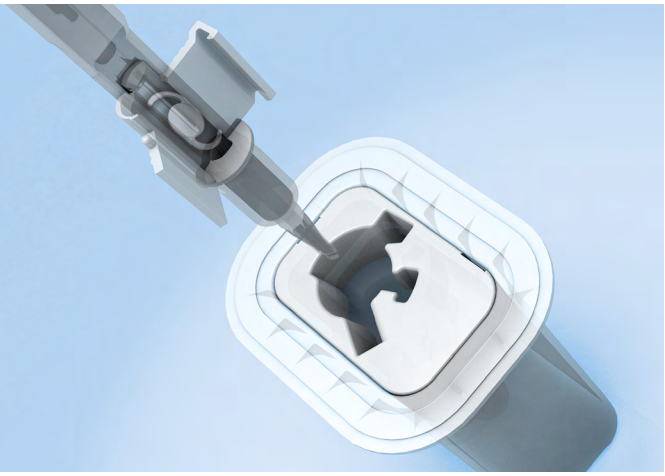
- 100% of the study participants would decide again for the implantation of the TORICA-aA/-aAY

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

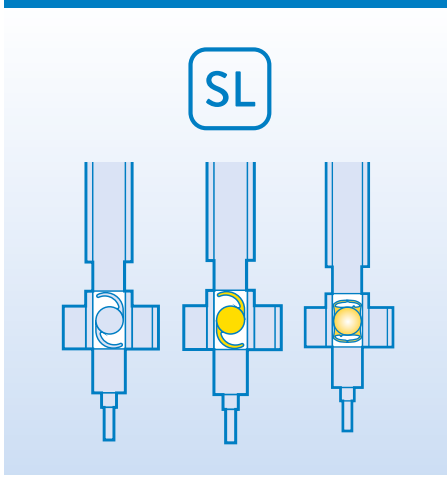
TORICA® – a convincing lens design.



SAFELOADER®

INTUITIVE. SIMPLE. FAST.

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



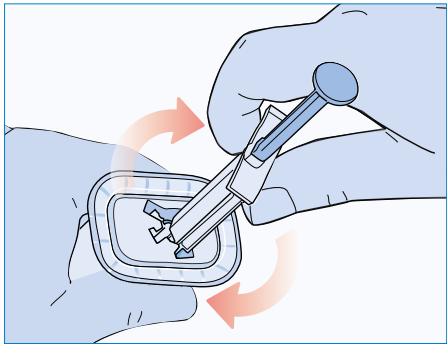
A SYSTEM FOR HIGH REQUIREMENTS

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

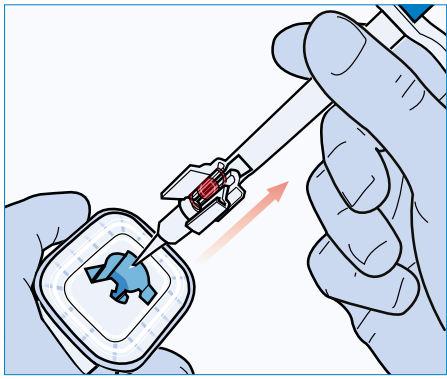
- Precise and reliable supply of the IOL
- Supports a fast, efficient surgical routine through intuitive, easy handling
- Maximum safety through separate components:
  separate storage of IOL and injector system for optimum sterilization processes

SAFELOADER® compatible Medicel AccuJect™ injector with yellow plunger	**XL-optic in SL** ASPIRA-aXA/-aXAY	**C-loop IOLs in SL** ASPIRA-aA/-aAY TRIVA-aAY/TRIVA*T*-aAY
AccuJect™ **1.8**-1P LP604540	-	Rev. **C** (2v7)
AccuJect™ **2.0**-1P LP604510	Rev. **B** (2v8)	
AccuJect™ **2.2**-1P LP604530	-	

All IOL models in the SAFELOADER® are compatible with the yellow Medicel AccuJect™ injectors only. Please pay attention to the corresponding revision C and B in relation to the IOL model, see table.

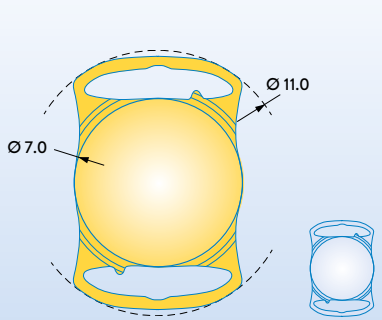
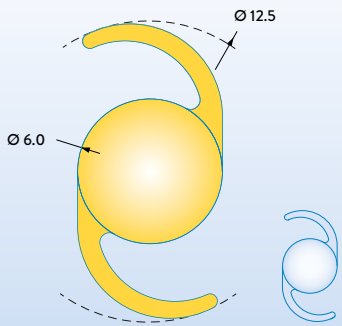


Insert injector;
turn to the right



Remove loaded injector,
close cartridge

Instantly ready to use.

	ASPIRA-aXAY YELLOW ASPIRA-aXA SL	ASPIRA-aAY YELLOW ASPIRA-aA SL
		
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 Further constants for the respective IOL model can also be found at www.IOLCon.org	
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	Preloaded in SAFELOADER® **10.0** bis **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

INJECTOR SYSTEM[12]

Medicel AccuJect™ in exclusive yellow HumanOptics version for:

- A comfortable implantation up to the limits of the power range
- XS incisions (≥ 1.8 mm*) in the extreme low diopter range **-20.0** D up to the main range max. **25.0** D
- Injector accessibility even in extreme ranges using small incisions technique up to **60.0** D and SE **60.0** D / Cyl **20.0** D
- Implantation of the **7.0 mm XL optic** through an XS incision (≥ 2.2 mm*)

* depending on the technique used

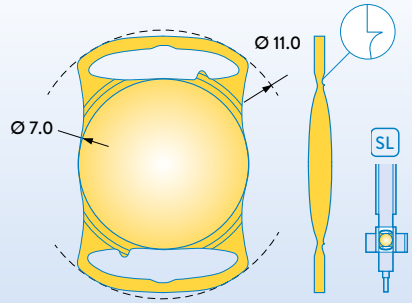
[12] Medicel Homepage https://www.medicel.com/de/produkte/iol-injektoren/accuject.html; https://www.medicel.com/en/lens-injection-systems/viscoject-bio.html

Intuitive. Simple. Fast.

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 dysphotopsia[9] and enables implantation through small incisions

EASY INTEGRATION INTO THE ROUTINE

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

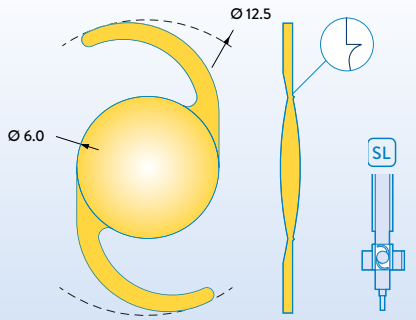
Pseudophakic reliability for you and your patients.

ASPIRA-aAY YELLOW
ASPIRA-aA
SL

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

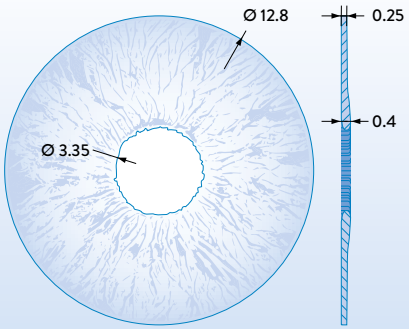
Type	**Monofocal** posterior chamber IOL, one-piece, foldable, blue-light protection optional
Optic diameter	6.0 mm
Total diameter	12.5 mm
Material	Hydrophilic acrylic with UV-absorber, glistening-free
Optic features	Aspheric anterior surface, aberration-free, 360° lens epithelial cell barrier
Haptic 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.

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

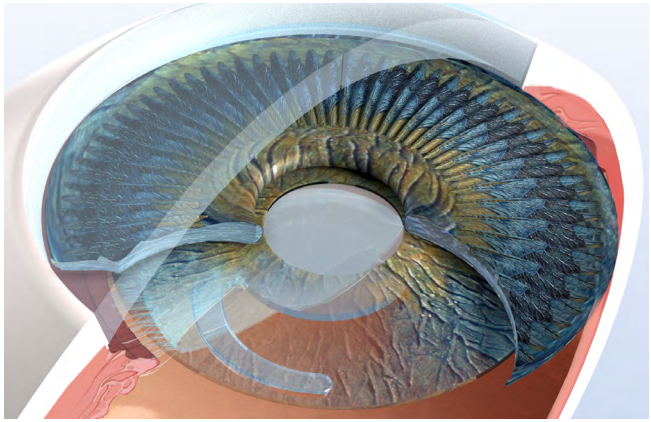
Two models

MEDICAL REHABILITATION

- Reduction of photic phenomena[10]
- Elimination of transillumination defects
- Improved contrast sensitivity[11]

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

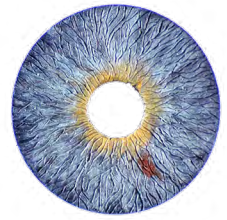
Flexible
Choose the optimum implantation method for your patient and combine the CUSTOM*FLEX*® ARTIFICIAL*IRIS* with your preferred IOL

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.



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® 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-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-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!

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

REFERENCES

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 k 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.

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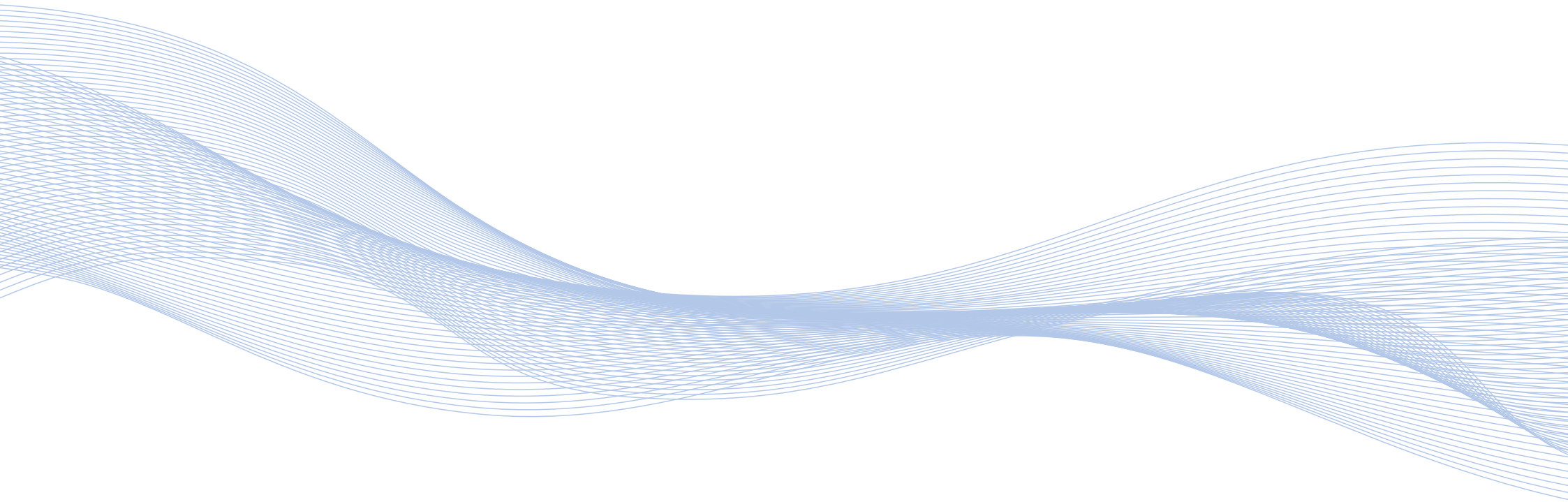

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