CSO

C-EYE UV-A

LIGHT EMITTER FOR CORNEAL CROSS-LINKING

C-EYE

UV-A LIGHT EMITTER FOR CORNEAL CROSS-LINKING

C-eye is an advanced corneal cross-linking device designed to provide safe, effective, and customizable treatments for keratoconus, corneal ectasia, and infectious keratitis.

Designed to support ophthalmologists throughout every stage of the procedure, C-eye combines advanced technology, ease of use, and outstanding reliability, ensuring precise control of all treatment parameters.

PORTABLE AND VERSATILE

C-eye is designed to adapt to a wide range of clinical workflows, providing exceptional flexibility for every cross-linking procedure.

For the traditional approach, treatment can be performed with the patient in the supine position on a surgical bed using the dedicated table stand.

For a more streamlined and efficient workflow, C-eye can be used directly on a slit lamp thanks to dedicated adaptors that make it compatible with both top-illumination and bottom-illumination slit lamp designs.*

For the complete list of compatible slit lamp models, please contact your authorized CSO distributor.

C-eye can also be integrated with the Schwind AMARIS excimer laser through a dedicated support, enabling corneal cross-linking to be performed immediately after laser treatment without repositioning the patient, thereby optimizing the entire surgical workflow.

C-EYE PROTOCOLS

Designed for maximum clinical flexibility, C-eye supports the main corneal cross-linking protocols published in the scientific literature, including both epithelium-on (epi-on) and epithelium-off (epi-off) procedures, with continuous or pulsed UV-A irradiation. This allows clinicians to select the most appropriate treatment protocol for each patient's specific clinical condition.

Dresden Protocol

3 mW/cm²

30'00'' min/sec

Continuous 5.4 J/cm² fluence

The so-called "Dresden protocol" is the original epi-off CXL protocol that started corneal cross-linking in 1999

10 min A-CXL

9 mW/cm²

10'00'' min/sec

Continuous 5.4 J/cm² fluence

Also called "A-CXL", this accelerated epi-off CXL protocol uses a 10-minute irradiation time at an intensity of 9 mW/cm², resulting in a standard fluence of 5.4 J/cm²

5 min A-CXL

18 mW/cm²

5'00'' min/sec

Continuous 5.4 J/cm² fluence

This accelerated epi-off CXL protocol uses a 5-minute irradiation time at 18 mW/cm², delivering a standard fluence of 5.4J/cm²

ELZA High-Fluence

18 mW/cm²

9'15'' min/sec

Continuous 10.0 J/cm² fluence

This accelerated high-fluence epi-off CXL protocol was developed at the ELZA Institute in Zurich, Switzerland.

The sub400 protocol for thin and ultrathin corneas is integrated in the C-eye device. This protocol provides individualized fluence to the cornea, delivering the right amount of energy that will stabilize the cornea, avoiding excessive UV exposure.

- The first generation of the sub400 protocol has been published in the American Journal of Ophthalmology in 2021 and uses a starting fluence of 5.4 J/cm? at 400 um of thickness.
- The 2nd generation sub400 protocol starts with a high fluence of 10J/cm? at 400 um.

The open mode allows for any customized combination of intensity and irradiation time as long as the total fluence is not exceeding 10 J/cm?.

- Background: besides the most established CXL
- Protocols, there are other, less widespread protocols that require a different combination of intensity and irradiation time.
    - The mode of UV-A irradiation is continuous or pulsed light.

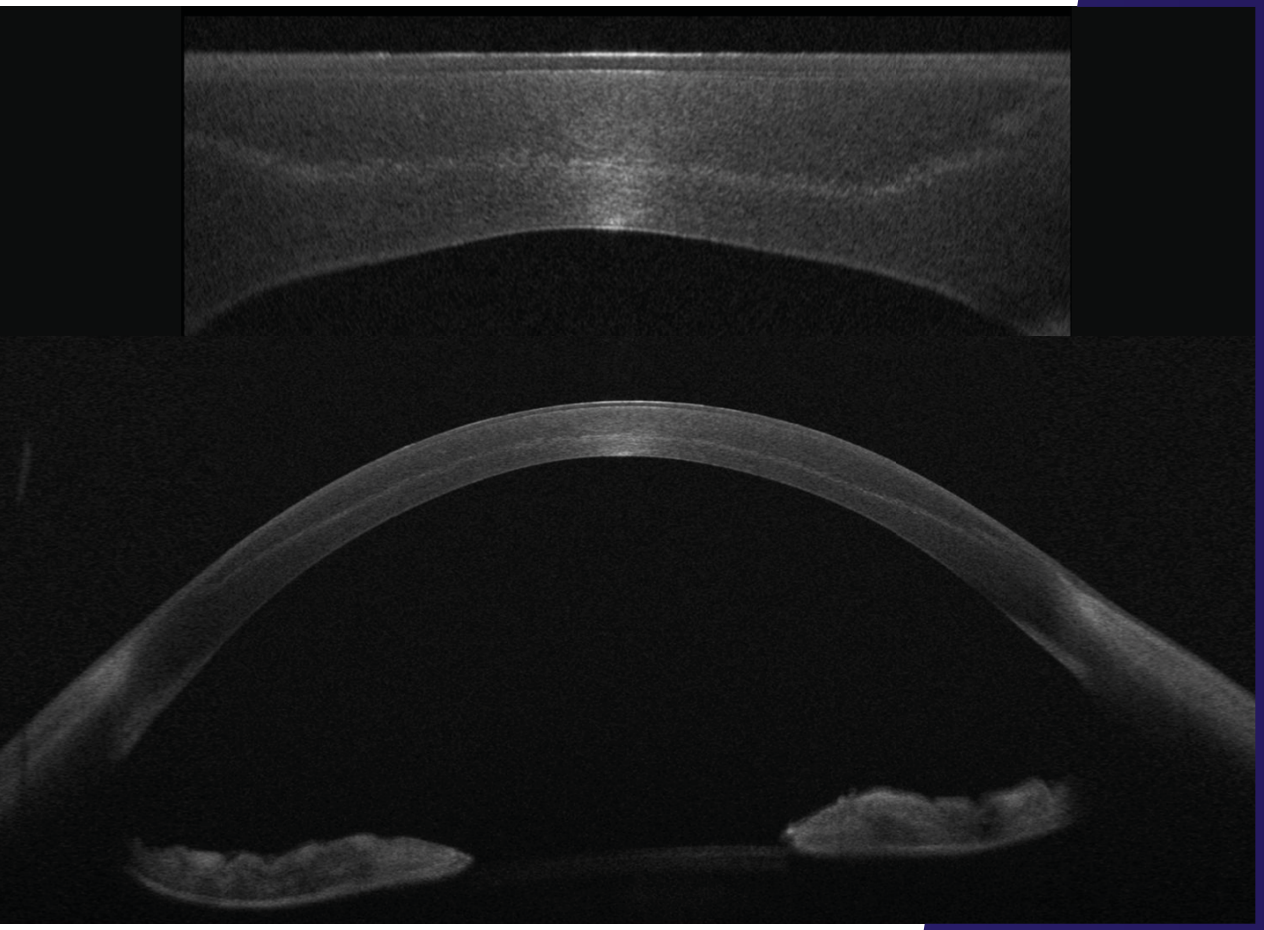
- Accelerated high-fluence PACK-CXL protocol using 10 and 15 J/cm?
- Recent evidence shows that
    - The corneal endothelium, even when perfectly transparent, can tolerate high fluences up to 15 J/cm' without damage (Seiler et al., 2019)
    - The opaque infected cornea transmits much less UV light than a transparent cornea, so the fluence arriving at the level of the endothelium is even further attenuated (Lu et al, 2024)
    - Higher fluences do not only kill more micro-organisms, they also increase the tissue's resistance to digestion.
    - This protocol is currently most often used in:
    - Infectious keratitis of bacterial and fungal origin
    - Sterile corneal melting

C-EYE PROTOCOLS

Xtra	Refractive 1	Refractive 2
30 mW/cm²	9 mW/cm²	18 mW/cm²
1'30'' min/sec	5'00'' min/sec	2'30'' min/sec
Continuous 2.7 J/cm² fluence	Continuous 2.7 J/cm² fluence	Continuous 2.7 J/cm² fluence

High-intensity low-fluence accelerated CXL protocols used in refractive surgery

- A number of different irradiation protocols have been published. They all share a fluence that is distinctly lower than the 5.4 J/cm' standard fluence.
- Indications include:
- LASIK Xtra
- SMILE Xtra
- PRK Xtra



THICKNESS-ADJUSTED IRRADIATION PROFILE

To ensure a more uniform treatment and minimize differences between the central and peripheral cornea, C-eye features a calibrated UV-A energy profile that delivers a gentler irradiance to the central cornea while gradually increasing the intensity toward the periphery.

This optimized energy distribution promotes a more homogeneous treatment across the entire corneal surface.

SAFETY FEATURES

Safety is at the core of C-eye's design, providing confidence for both the patient and the surgeon throughout every procedure.

The smart battery management system continuously monitors the available charge. When the battery level reaches the minimum safety threshold, the indicator turns red and the system prevents the start of a new treatment unless the device is connected to the power supply, eliminating the risk of an interrupted procedure.

To ensure the highest level of treatment accuracy, C-eye continuously controls the two key parameters of corneal cross-linking: **irradiation time and UV-A energy delivery**. A redundant dual-timer system independently monitors treatment duration, while **two integrated UV sensors**—one internal and one external—verify the emitted irradiance. This dual-monitoring architecture provides continuous validation of the UV output both during calibration and throughout the treatment, ensuring reliable and consistent energy delivery at every stage of the procedure.

LOCKED OR UNLOCKED THE FREEDOM TO CHOOSE

C-eye is available in two configurations, enabling practitioners to choose the solution that best suits their clinical practice

Locked Version

The Locked version has been designed to ensure maximum treatment consistency by operating exclusively with RiboKER®, EMAGINE's riboflavin solution. Treatment is enabled simply by scanning the NFC tag integrated into each RiboKER® package, which automatically unlocks the procedure.

This approach ensures that C-eye is always used under the same conditions in which it was developed, validated, and clinically tested, providing a standardized workflow and helping to maximize treatment reproducibility.

Unlocked Version

The Unlocked version offers complete freedom of choice. Clinicians can use any certified riboflavin formulation compatible with their preferred clinical protocol, allowing the system to be integrated seamlessly into existing workflows

ACCESSORIES

C-FOCUS

C-Focus is the dedicated optical focusing accessory developed to simplify the alignment of C-eye before treatment in the operating room use. Based on a prism optical system, it enables the surgeon to quickly achieve the correct working distance

C-VIEW

C-View is an advanced operating room focusing system designed to simplify and accelerate device alignment.

Using projected light patterns, C-View provides immediate visual feedback on the correct working distance and focus tolerance, allowing fast and intuitive positioning before treatment begins.

An integrated white LED illumination further assists the surgeon during alignment, particularly in low ambient light conditions, improving visibility and enhancing overall workflow efficiency.

C-STAND

Designed for operating room use, the C-Stand provides a compact and stable mounting solution for C-eye. Its small footprint allows it to be easily clamped to surgical tables or existing support structures, making it ideal for any operating room layout.

The fine micrometric adjustments enable precise positioning of the C-eye treatment head, ensuring accurate alignment with minimal effort.

The C-Stand also includes C-Focus, the prism-based optical focusing system

FLOOR STAND

The Floor Stand offers a self-supporting solution for using C-eye in the operating room, eliminating the need for external mounting systems.

Its height-adjustable articulated arm allows the C-eye treatment head to be positioned quickly and precisely, ensuring excellent ergonomics and an efficient clinical workflow.

For focusing, the Floor Stand can be equipped with either C-Focus, the prism-based optical focusing accessory, or C-View, the advanced projection-based focusing system

	Power Supply	
	Technical data	**Value**
	Power input	100-240V - 50-60 Hz - 160-80 mA
	Power output	Max 7 W
	Rated output current	1.4 A
	Rated output voltage	+5V
	Connector	USB
	Operating temperature range	0°C/+45°C
	Humidity	≤90% without condensation

	C-eye	
	Technical data	**Value**
	Power supply	4 rechargeable BK8AAAB Nikel Metal Hydrade batteries. With power supply cable and 5V power supply unit only if the device is mounted on the accessories.
	Diaphragm opening	From 5 to 12 mm
	Light source	UV-A 365 nm
	Intensity levels	3, 9, 18 and 30 mW/cm2
	Dimensions (Height x Length x Depth)	182 x 55 x 62 mm
	Device weight	450 g
	Weight of the C-SL1 accessory (lamps with illumination from above)	110 g
	Weight of the C-SL2 accessory (lamps with illumination from below)	170 g
	Weight of the C-ST accessory, stand fitting (optional)	1900 g
	Weight of the mains power supply	550 g
	Weight of the USB power supply cable	140 g
	Working distance between device and patient	36 mm ± 5 mm (*)
	Accessories	C-stand Floor stand C-view C-focus
	(*) The value indicated refers to the optimal distance between the device’s UV emitter and the patient's eye (C-eye CAP excluded).	


C-eye
UV
ok

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