



**CLEAR**

Lenticule Extraction  
Redefined

# The New Lenticule Application by Ziemer *Available for the FEMTO Z8*

ziemer   
OPHTHALMOLOGY



# CLEAR

## Lenticule Extraction Redefined

CLEAR is a completely new and proprietary Lenticule application for refractive correction. This minimally invasive procedure offers a wide choice of centration options and more convenience for a guided Lenticule extraction, combined with the highest safety standards.

The low energy concept used in the versatile FEMTO Z8 platform provides an excellent surface quality and is a gentle procedure that redefines Lenticule extraction.



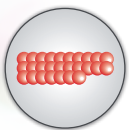
### Centration Options

Multiple options for centration are available to meet every surgeon's needs. Centration made easy and precise in every case.



### Guided Extraction

Guiding tunnels lead the instrument to the Lenticule planes and the Lenticule extraction is supported by using our inbuilt OCT system.\*



### Low Energy Concept

The Ziemer's low energy concept is minimally invasive and results in a gentle eye surgery.



### FEMTO Z8 Platform

One customizable laser platform, with a wide range of applications. CLEAR is an optional software upgrade.

The new Lenticule application by Ziemer is named CLEAR:

**C** Corneal  
**L** Lenticule  
**E** Extraction for  
**A** Advanced  
**R** Refractive Correction

Indication range:

The completely new developed and proprietary application is intended for the treatment of Myopia and Astigmatism.

Sphere                      -0.50 D to -10.00 D  
Cylinder                    0 D to -5.00 D  
Spherical equivalent   -0.50 D to -12.50 D

\* OCT use is according to surgeon preference

# Centration Options

Easy centration on the eye  
is ensured



Precise centration of the refractive Lenticule is key to optimized visual outcomes. Several centration options are available – pupil center, fixation light or corneal marking. Compensation for cyclotorsion is provided and individual centration of the Lenticule under suction is possible.



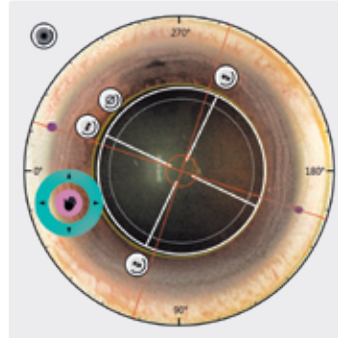
## Centration after docking is possible

The Lenticule can be moved on the touchscreen to the desired position under suction. This allows centration adjustment while ensuring an efficient surgical workflow.



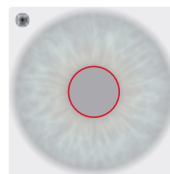
## Compensation for cyclotorsion

This feature improves refractive outcomes for patients with astigmatism. Cyclotorsion compensation can be automatically or manually adjusted intraoperatively after vacuum is applied.

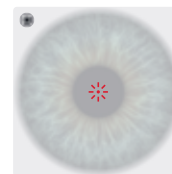


## Different centration options

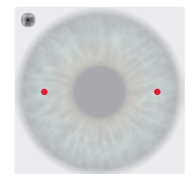
The surgeon can select centration on pupil center, by fixation light or corneal marking. Centration is achieved automatically but could be adjusted manually afterwards. These centration options provide a customized procedure for every patient and ensure optimal visual outcomes.



Pupil center



Fixation light



Corneal marking

# Guided Extraction

## Easy Lenticule extraction with guiding tunnels

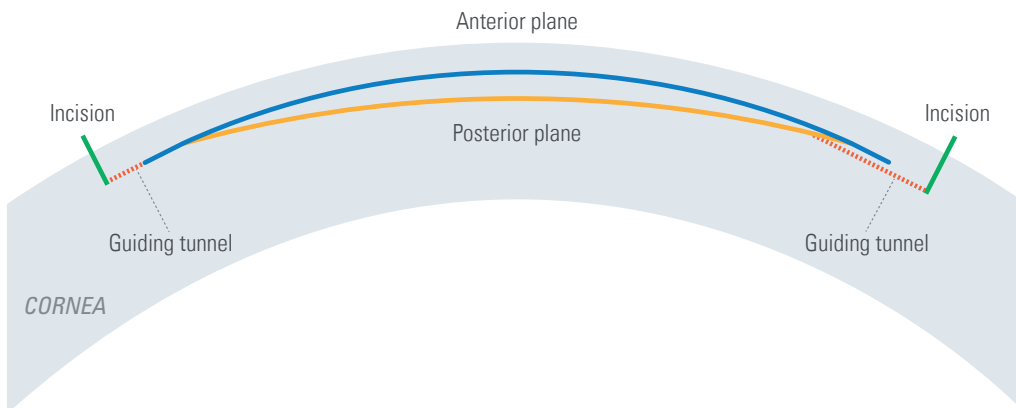


Together with the exceptional precision of the FEMTO Z8 platform, CLEAR provides an excellent surface quality for easy Lenticule plane separations. The surgeon can choose between one or two incisions, depending on individual preference, and freely place them to a comfortable working position. The guiding tunnels help to facilitate the separation of the anterior and posterior plane, and result in an easy Lenticule extraction.



## Guiding tunnels for an easy Lenticule separation

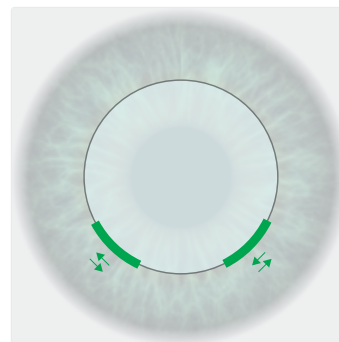
Two guiding tunnels can be created leading to the anterior and posterior planes, and offer the benefit of easy Lenticule separation.



Guiding tunnels which lead to the anterior and posterior plane

## Multi incision options and adaptable placement

With CLEAR, surgeons can choose between one or two incisions, according to their individual preferences. For example, one incision for experienced surgeons, or two incisions that can provide easier separation of the Lenticule and help during the initial learning curve. Surgeons can freely place the incision(s) to a comfortable working posture. It is even possible to change the position after suction is applied.

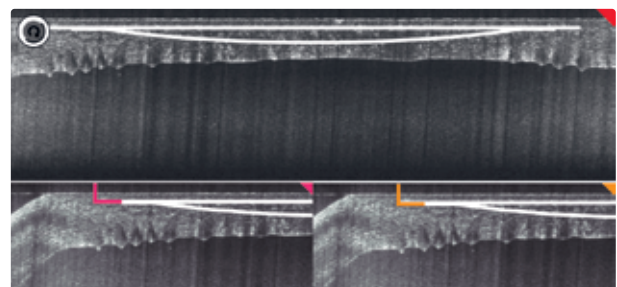


Flexible incision placement

## Surgical planning with OCT imaging

Our intraoperative OCT system (Optical Coherence Tomography) provides for better visualization and planning<sup>1</sup>. The advantages are:

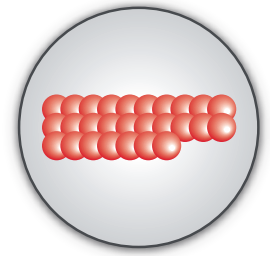
- Enhanced surgical planning and better visual control of the treatment zone
- Verification of the cuts within the applanation area and visualization of corneal layers as a reference for surgical decisions



OCT scan showing planned Lenticule, incisions, and guiding tunnels

# Low Energy Concept

## Low energy pulses for a fast visual recovery



The FEMTO Z8 uses low energy pulses in the nanojoule range and a high pulse repetition rate. This results in extremely high precision, gentle treatments and enables complete and smooth resections. The Ziemer's low energy concept provides minimal tissue damage<sup>2,3</sup>, negligible inflammatory response<sup>2</sup> and is known to contribute to fast visual recovery.





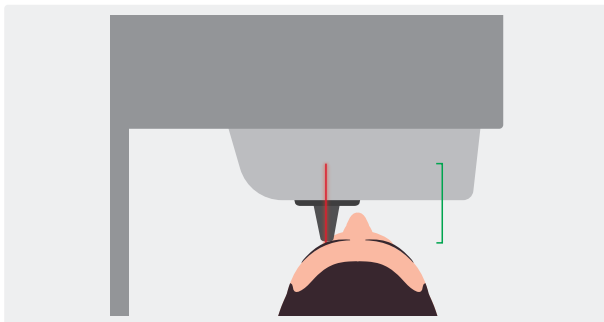
## Low energy per pulse

The FEMTO Z8 is designed for maximal precision and gentle eye surgery. Ziemer laser technology is known for the following outstanding features:

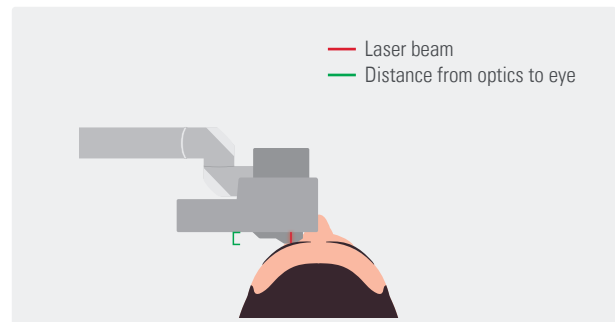
- Low energy per pulse in the nJ range for gentle treatments
- Minimal stress to the surrounding tissue<sup>2,3</sup>
- A proprietary Lenticule scan pattern for excellent surface quality

## Short working distance

Thanks to the specially designed Ziemer handpiece, there is a very short working distance to the eye. Therefore an extremely high level of precision can be achieved and only very little energy is needed.



Conventional femtosecond lasers

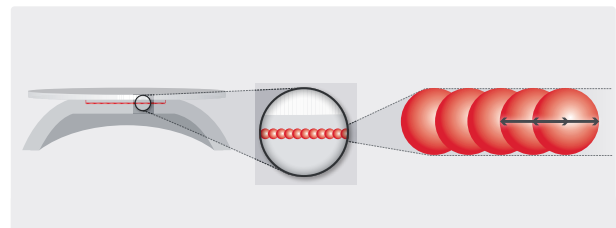


FEMTO Z8 by Ziemer

## Overlapping laser spots

Different from other lasers, the FEMTO Z models feature overlapping laser spots that result in:

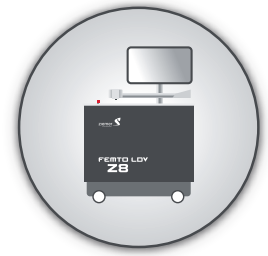
- Complete resections free of tissue bridges<sup>4</sup>
- Excellent stroma bed quality<sup>2</sup>
- High precision in cutting performance<sup>5</sup>



Dense spacing of the laser pulses results in overlapping spots

# FEMTO Z8 Platform

## One platform as a reliable companion



The FEMTO Z8 is a unique offering in the market place and is the perfect partner for your refractive practice. It is compact, and easy to mobilize – a solid state device that automatically calibrates.

The FEMTO Z8 offers multiple applications that can be customized for your surgical needs and grows as your practice and technology advances. The new Lenticule application CLEAR is an optional software upgrade.



## Modular platform solution

There are lasers, and there is the Ziemer femtosecond laser family. No laser is more precise, more powerful or more portable when it comes to meeting all your procedure needs in a single platform:

- Trusted vacuum – as known in all Ziemer systems
- Precise tissue separation – proven by millions of surgeries
- Compact footprint – enhances surgical workflow
- Mobile laser platform – roll in and out
- Device can be used either in a refractive room or in a sterile OR<sup>6</sup>
- Intraoperative OCT – supports a better visualization and planning in every application<sup>6</sup>
- Wide spectrum of applications – Cornea and Cataract

## Be ready for the future

In the future, the FEMTO Z8 laser can be integrated with our GALILEI diagnostic devices and our upcoming AQUARIUZ ablation laser, to create a refractive suite that provides all needs of Refractive, Corneal and Cataract surgeons – one complete, complementary cutting-edge refractive platform that will take your practice to the next level.



**We strive to empower Ophthalmologists to deliver better vision care to their patients by providing superior surgical and diagnostic tools.**



# CLEAR

Lenticule Extraction  
Redefined

## Why Ziemer?

- Trusted – More than 1200 systems installed worldwide
- High-tech lasers and diagnostics made in Switzerland
- A family-owned company with personal service
- Cutting-edge innovation in Ophthalmology

The FEMTO Z8 is CE marked and FDA cleared. The Lenticule extraction application is CE marked but not yet FDA cleared for use in the United States. For other countries, availability may be restricted due to regulatory requirements. Please contact Ziemer for details.

### References:

- 1 Liu, Y.-C., et al. (2019). "Intraoperative Optical Coherence Tomography–Guided Femtosecond Laser–Assisted Deep Anterior Lamellar Keratoplasty." *Cornea* 38(5): 648-653.
- 2 Riau, A. K., et al. (2014). "Comparative study of nJ- and μJ-energy level femtosecond lasers: evaluation of flap adhesion strength, stromal bed quality, and tissue responses." *Invest Ophthalmol Vis Sci* 55(5): 3186-3194.
- 3 Williams, G. P., et al. (2016). "The effects of a low-energy, high frequency liquid optic interface femtosecond laser system on lens capsulotomy." *Sci Rep* 6: 24352.
- 4 Leccisotti, Antonio MD, PhD\* Femtosecond laser–assisted hyperopic laser in situ keratomileusis with tissue-saving ablation: Analysis of 800 eyes, *Journal of Cataract & Refractive Surgery*: July 2014 - Volume 40 - Issue 7 - p 1122-1130 doi: 10.1016/j.jcrs.2013.11.031
- 5 Ahn, H., Kim, J. K., Kim, C. K., Han, G. H., Seo, K. Y., & Kim, E. K. (2011). Comparison of laser in situ keratomileusis flaps created by 3 femtosecond lasers and a microkeratome. *Journal of Cataract & Refractive Surgery*, 37(2), 349-357.
- 6 Vasquez-Perez A, Simpson A, Nanavaty MA. (2018). "Femtosecond laser-assisted cataract surgery in a public teaching hospital setting." *BMC Ophthalmology*, 18(1): 26.

