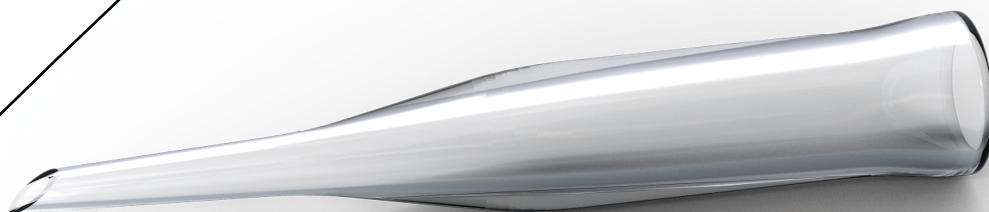


Geuder®

**DMEK**

# Descemet Membrane Endothelial Keratoplasty

Instruments for treating endothelial corneal  
diseases



**Geuder®**

Germany

# Instrument Line – for small clear cornea incisions

## Revolutionary system for treating endothelial corneal diseases

Prof. Peter Szurman, MD  
Knappschaftsklinikum Saar,  
Sulzbach, Germany



Corneal grafts are the most common tissue transplants. Many years ago, penetrating keratoplasty became clinical routine. But transplantation techniques have evolved, replacing perforation with lamellar keratoplasty.

Almost half of all keratoplasties are performed to cure endothelial corneal diseases. In many cases, penetrating keratoplasty is excessive since the simple transplantation of vital endothelial cells would often suffice. This is why posterior lamellar techniques, especially DMEK, established as an alternative, widely atraumatic, solution for treating endothelial corneal diseases.

DMEK (Descemet Membrane Endothelial Keratoplasty) is limited to the isolated Descemet membrane and endothelial cells without stroma, with a thickness of only approx. 15 µm.

### Clinical Advantages of DMEK

Transplanting the extremely thin Descemet membrane offers faster visual recovery than other lamellar keratoplasty techniques. DMEK prevents interface problems, causes neither postoperative astigmatism nor myopia and substitutes more endothelial cells (up to 9.5 mm graft size). As a result, visual acuity improves in many cases by 0.8 or better after only one week. Due to these benefits, DMEK became a gold standard in the therapy of endothelial corneal diseases.

### Instruments

for standardizing DMEK

The success of this elegant technique is largely dependent on the number of vital endothelial cells and quality of the fragile graft and the gentle manipulation thereof. It is important that the fragile endothelial cells are not touched or stressed mechanically during preparation or implantation. In order to achieve reproducible results a standardized technique and specific instruments, which ensure a touch-free surgical procedure, are necessary.

The Liquid Bubble technique, which was developed in Sulzbach, Germany, uses a liquid for gentle separation of the Descemet membrane from the stroma beneath. It is another step towards the standardization of DMEK.

On the following pages we have compiled a surgical set which will give experienced surgeons the opportunity to perform DMEK in the clinical routine. This set allows for a touch-free preparation of the Descemet membrane and its subsequent transplantation.

### Literature Selection

1. Melles GR, Ong TS, Ververs B, van der Wees J. Descemet membrane endothelial keratoplasty (DMEK). *Cornea* 2006; 25: 987-90
2. Cursiefen C, Kruse FE, Erlanger DSAEK Gruppe. Descemet's stripping automated endothelial keratoplasty (DSAEK). *Der Ophthalmologe* 2009; 106: 939-52
3. Yoruk, E, Szurman P. Autologous Descemet Membrane Endothelial Keratoplasty, *Cornea* 2012; 31: 208-210
4. Szurman P, Januschowski K, Rickmann A, Damm LJ, Boden KT, Opitz N. Novel liquid bubble dissection technique for DMEK lenticule preparation. *Graefes Arch Clin Exp Ophthalmol*. 2016; 254: 1819-1823
5. Rickmann A, Wahl S, Katsen-Globa A, Szurman P. Safety analysis and results of a borosilicate glass cartridge for no-touch graft loading and injection in Descemet membrane endothelial keratoplasty. *Int Ophthalmol* 2019; 39: 2295-2301
6. Rickmann A, Wahl S, Hofmann N, Knakowski J, Haus A, Borgel M, Szurman P. Comparison of preloaded grafts for Descemet membrane endothelial keratoplasty (DMEK) in a novel preloaded transport cartridge compared to conventional precut grafts. *Cell Tissue Bank* 2020; 21: 205-213

Geuder®

# Brilliantly Simple

# The Implantation Cartridge

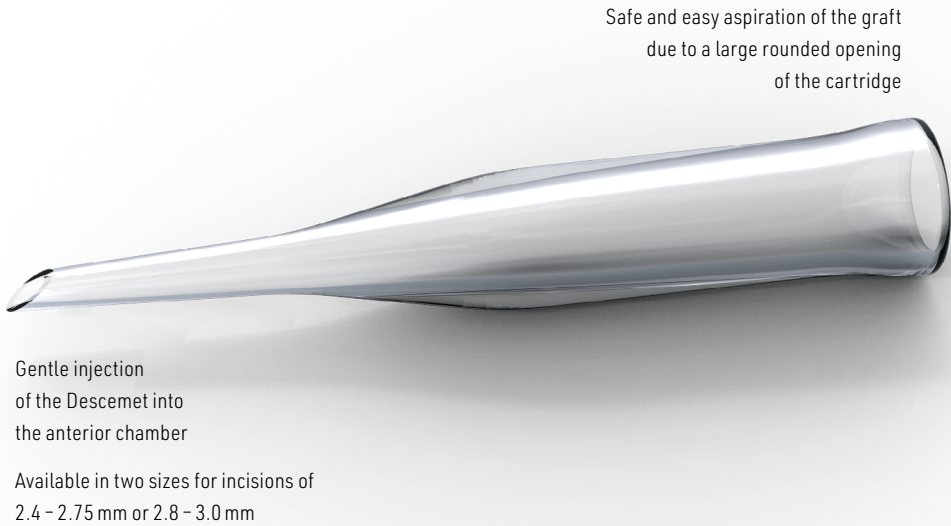
Simplification and standardization of DMEK

Touch-free and gentle handling  
of the Descemet membrane

Intelligent Design

Touch-Free Technique

- Gentle handling of the sensitive endothelium through smooth aspiration into the cartridge
- Implantation into the anterior chamber without direct manipulation of the endothelium and Descemet membrane
- Reduced loss of endothelial cells and reliable preservation of their functionality



Elegant Functionality

Crystal Clear and Smooth

- Implantation of Descemet membrane under visual control prevents complications caused by wrong alignment of the graft within the eye
- Reduced surface friction saves endothelial cells and preserves high quality of the graft
- High safety for endothelial cells through streamlined design and smooth surface of the transparent cartridge

No Suture

Less Adverse Effects

- Small incision size of 2.4 - 2.75 mm or 2.8 - 3.0 mm for fast visual recovery and satisfied patients
- Avoiding surgically induced astigmatism and other unwanted adverse effects

Well Conceived

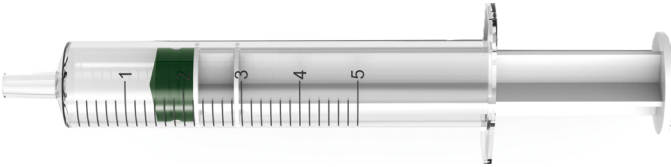
The Accessories

- Low additional costs through compatible standard accessories

Geuder® DMEK Accessories

38610

Single-Use Syringe BD Emerald™  
Luer slip, 5 ml, sterile  
100 pcs. per box



38611

Single-Use Tubing with Luer Connector  
for rinsing and staining the Descemet membrane  
6 pcs. per box, sterile









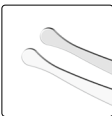

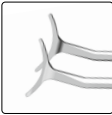

Geuder® Preparing the Donor Eye  
1 Preparing the Donor Cornea

Secure fixation of the donor cornea is the first step in preparing the valuable Descemet membrane

GS-38620	SZURMAN DMEK Graft Retainer for preparation of DMEK graft	
GS-38623	REMKY DMEK Keratoplasty Forceps modified by SZURMAN to hold graft during preparation	 

Geuder® Preparing the Donor Eye  
2<sup>A</sup> Classic Preparation




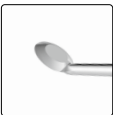







In order to prepare the Descemet membrane, lift the lamella carefully at the periphery and scrape it gently 360° towards the center. Take care that the membrane does not rupture and endothelial cells remain intact.

GS-38621	SZURMAN DMEK Preparation Scraper for removal of Descemet membrane from graft	 
GS-38622	SZURMAN DMEK Preparation Spatula for removal of Descemet membrane from graft	 
GS-38624	SZURMAN DMEK Preparation Forceps for removal of Descemet membrane from graft	 
GS-38628	YÖRÜK DMEK Transplant Forceps for grasping and removal of Descemet membrane from graft grasping area 6 mm	 

Geuder® Preparing the Donor Eye  
2<sup>B</sup> Preparation – The Liquid Bubble Technique  
by Szurman

At an appropriate location within the trabecular meshwork of the donor cornea prepare a small tunnel in order to overcome the zone of strongest adherence within the stroma. Inject a suitable dye (e.g. trypan blue) under the Descemet membrane to dissect the membrane from the stroma.

At the same time the dye stains the membrane selectively without damaging sensitive endothelial cells.


GS-81002	Vioron® Staining Solution Trypan Blue approved for DMEK 0.5 ml syringe 5 pcs. per box, sterile	
GS-34191	NanoEdge MVR Stiletto angled 20 gauge/ 0.9 mm 6 pcs. per box, sterile, single-use	 
GS-38622	SZURMAN DMEK Preparation Spatula for removal of Descemet membrane from graft	 
GS-16189	Spatula angled, 45° 0.5 mm wide x 0.25 mm thick	 
GS-32167	SAUTTER Hydrodissection Cannula horizontally flattened tip 27 gauge/ 0.4 mm	 
GS-15134	Micro Colibri Forceps with tying platform extremely delicate for corneal graft	 

Geuder® Preparing the Donor Eye  
3 Punching Out the Donor Cornea

The last step of preparation involves punching out the desired size of the lamella of the donor cornea. After storing the graft in liquid peel off the lamella from the stroma with a preparation spatula.

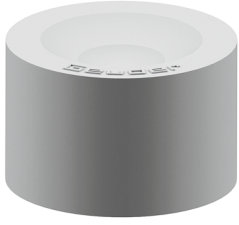
520800

**NanoEdge  
Trepine**  
8.00 mm  
(other diameters  
in 0.25 increments  
available)  
length 16 mm  
sterile, single-use



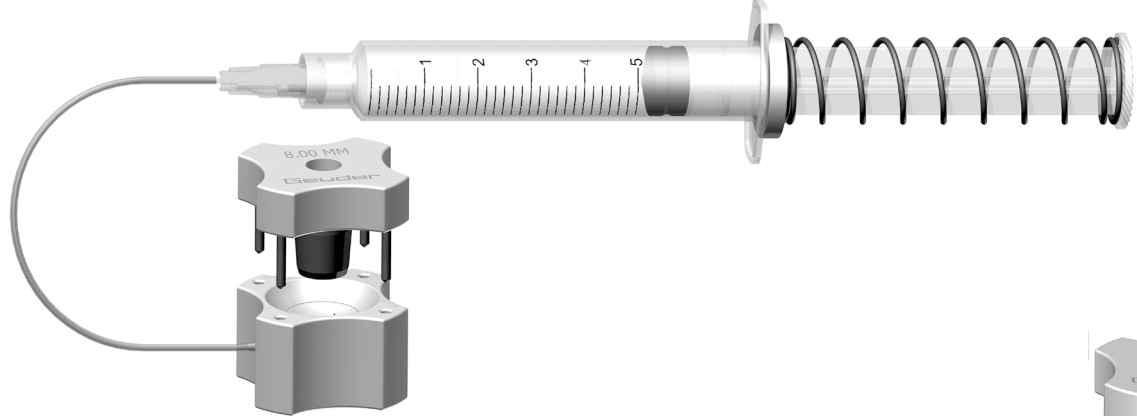
32671

**ÖRK LINZ MODEL  
Silicone Block  
for DMEK**  
for donor cornea,  
white-colored



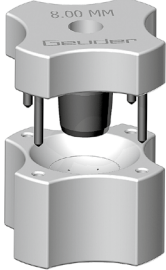
560800

**NanoEdge Vacuum Trepine Punch**  
8.00 mm  
(other diameters in 0.25 mm  
increments available)  
sterile, single-use



540800

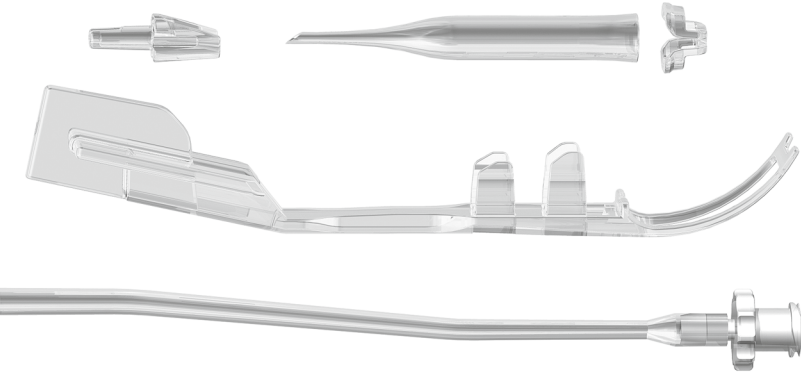
**NanoEdge Trepine Punch  
(without vacuum)**  
8.00 mm (other diameters in  
0.25 mm increments available)  
sterile, single-use



Geuder® Preparing the Donor Eye  
4 Pre-Loading Descemet Membrane

38626

**SZURMAN  
DMEK Rapid**  
single-use DMEK transportation  
cartridge  
for transportation and injection  
of prepared Descemet membrane  
incl. cartridge, 2 plugs,  
transportation holder for cartridge  
and connection for loading the cartridge  
6 sets per box, sterile, single-use




Geuder® Preparing the Patient Eye  
1 Main Incision, Paracentesis and Iridectomy

Due to the slender design of the DMEK cartridge a sutureless clear cornea incision of 2.4 to max. 3.0 mm is sufficient. The Hattenbach 25 gauge hybrid scissors are optimal for the pressure compensating iridectomy.


34094  
34053  
34055

**NanoEdge Phaco Slit Knife**  
angled, double bevel  
6 pcs. per box, sterile, single-use




34192

**NanoEdge MVR Stiletto, straight**  
straight, incision width 0.8 mm  
for instruments 23 gauge/ 0.6 mm  
6 pcs. per box, sterile, single-use




34196

**NanoEdge MVR Stiletto, angled**  
angled, incision width 0.8 mm  
for instruments 23 Gauge/ 0.6 mm  
6 pcs. per box, sterile, single-use




32948

**HATTENBACH  
Hybrid Scissors**  
for the anterior chamber  
25 gauge/ 0.5 mm







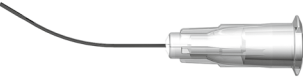
31491

**Clear Cornea Incision Fixation Ring**  
inside diameter 13 mm  
9 atraumatic teeth









Geuder® Preparing the Patient Eye  
2 Preparing the Anterior Chamber

The Geuder tried and tested hydrodissection cannulas offer free movement during DMEK. Prepare the anterior chamber with BSS or air.

GS-32167	SAUTTER <b>Hydrodissection Cannula</b> horizontally flattened tip 27 gauge/ 0.4 mm		
GS-34245	SAUTTER <b>Hydrodissection Cannula Single-Use</b> vertically flattened tip 27 gauge / 0.4 x 22 mm 10 pcs. per box, sterile	 	

Geuder® Preparing the Patient Eye  
3 Descemetorhexis

Incision hooks, the Descemet scraper and rhexis forceps enable a safe circular incision, a complete rhexis of the recipient membrane and a subsequent polish.

GS-38607	<b>Descemet Incision Hook</b> diameter of hook: 0.2 mm		
GS-38608	<b>Descemet Scraper</b> tip 1 mm, half-round		
GS-38634	GERTEN <b>DSAEK/ DMEK Rhexis Forceps</b> for Descemetorhexis and scraping reversed triangular tips 23 gauge/ 0.6 mm		

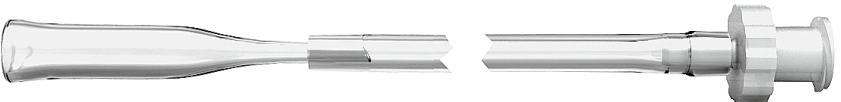

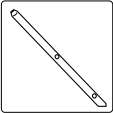

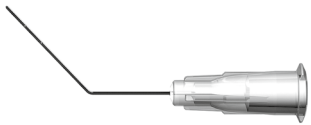
Geuder® Preparing the Patient Eye  
4 Implantation of the Graft

The last and crucial step of the surgery is to insert the graft into the recipient's eye. For better visualization, stain the Descemet membrane with a suitable dye, e.g. Trypan Blue, before loading the DMEK cartridge.

Loading the cartridge through its large posterior opening is widely atraumatic for the Descemet membrane. The accompanying tube enables a touch-free and gentle aspiration of the membrane.

The transparent glass cartridge allows for a controlled injection of the graft into the anterior chamber. A double irrigation set enables touch-free unfolding and positioning of the Descemet membrane. An air or gas bubble (e.g. SF6) below the graft helps to attach the Descemet membrane to the cornea.

Geuders tried and tested hydrodissection cannulas offer free movement during DMEK. Prepare the anterior chamber with BSS or air.

	SZURMAN <b>Single-Use DMEK Cartridge</b> for Descemet membrane endothelial keratoplasty, incl. tube for loading the cartridge		
GS-38630	<b>Incision 2.8 – 3.0 mm</b> 14 gauge/ 2.0 mm, sterile		
GS-38635	<b>Incision 2.4 – 2.75 mm</b> 16 gauge/ 1.6 mm, sterile		
GS-34500	SAAD <b>Single-Use Unfolding Cannula</b> for unfolding the Descemet membrane 1 front port, 4 lateral ports 27 gauge / 0.4 mm 10 pcs. per box, sterile	 	
GS-80950	<b>EasyGas® SF6</b> ready-to-use gas tamponade syringe 40 ml, sterile		