

Precision at the Molecular Level

Ultrapure, Innovative Fluids
for Ophthalmic Surgery
Made in Germany



Fluoron[®]

Solutions for Every Challenge



Ultrapure. Validated. Clinically Proven.

Our silicone oils meet the highest purity specifications – with minimized oligosiloxanes and analytically validated purity parameters* Example: Siluron[®] 2000, Densiron[®] Xtra



Precise.

Making visible what matters. Our Dual Dye enables selective staining of the ILM (internal limiting membrane) and ERM (epiretinal membrane) – without unnecessary stress on retinal tissue. Example: Brilliant Peel[®] Dual Dye – Free from polyethylene glycol (PEG), aluminum, and trypan blue – with deuterium oxide for controlled sinking.



Efficiency in the OR Begins with the Product.

Ready-to-use solutions save time, reduce risks, and increase standardization of surgical workflows. Example: EasyGas[®] – Ready to use, prefilled, sterile – for seamless workflows.

* Meets the literature-recommended threshold of < 0.01% (< 100 ppm) for low molecular weight components (LMWC) – tested using analytically validated purity procedures.

Highlights of the Fluoron Product Range



Brilliant Peel® Dual Dye
 The non-toxic dual dye for easy and safe peeling of ILM and ERM

Siluron® Xtra
 The premium silicone oil with innovative molecular design

EasyGas®
 The first and only ready-to-use gas tamponade

F4H5® WashOut
 The fastest and safest solution for oil residues in the posterior segment

Ultrapure Solutions for Highest Demands



Intraocular Dyes

Vioron®
Excellent Visualization
in the Anterior Chamber
6 – 9

Brilliant Peel®
Significantly Improved
Staining Performance
10 – 11 / 14 – 17

Brilliant Peel® Dual Dye
The Perfect Tool
for Safe Peeling
12 – 17

Intraoperative Tamponades

F-Octane / F-Decalin
Essential for Complex
Retinal Procedures
18 – 21

Ready-to-Use Gas Tamponades

EasyGas®
Prefilled, Safe, Fast
22 – 25



Premium
Silicone Oil Tamponades

Siluron® 2000 and Siluron® Xtra
Stability and Injectability
26 – 27 / 30 – 33

Standard
Silicone Oil Tamponades

Siluron® 1000 and Siluron® 5000
Stability and control
28 – 33

Heavy
Silicone Oil Tamponades

Densiron® Xtra and Densiron® 68
The Endotamponades for
Complex Inferior Pathologies
34 – 39

F4H5® WashOut
Cleaning Solution

F4H5® WashOut
The Reliable Solution for
Silicone Oil Residues
40 – 41

* Tested using analytically validated purity procedures. The content of low molecular weight components (LMWC) [$< 0.01\%$] serves as a purity indicator according to literature recommendations. Corresponds to at least 99.99% purity.

Intraocular Dyes

Vioron® Trypan Blue

„Excellent
Visualization in the
Anterior Chamber.“

Prof. Tarek Katamish, MD

Professor of Ophthalmology at Cairo University



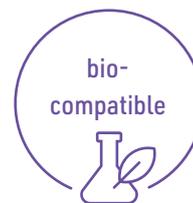
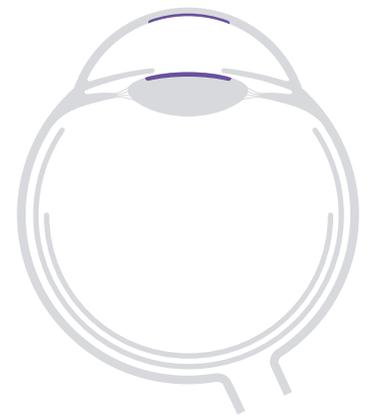
- Ultrapure trypan blue
- Selective staining of the anterior lens capsule
- Balanced osmolarity and pH value

Lens Capsule / Cornea

Capsulorhexis

DMEK / DS(A)EK

Lamellar Corneal Transplantations



Vioron® – Visible Precision in the Anterior Segment

Vioron® is a trypan blue dye for targeted staining of the lens capsule – ideal for mature cataracts or impaired vision. The controlled staining without unwanted diffusion facilitates capsulorhexis and improves overall view during surgery. Thanks to its high purity and biocompatibility, Vioron® supports safe intraoperative use.

Vioron® also improves visualization of the Descemet graft during DMEK, contributing to precise graft manipulation.

Recommended Instruments for Capsulorhexis

G-32944

HATTENBACH

Capsulorhexis Forceps

25 Gauge / 0.5 mm angled shaft with
micro grasping tips
overall length 88 mm



G-32940

H.-R. KOCH

Capsule Scissors

horizontal, 45° angled
2.5 mm blades, 360° rotatable head
22 Gauge / 0.7 mm straight shaft
overall length 107 mm



Recommended Instruments for DMEK



SZURMAN

Single-Use DMEK Cartridge

for Descemet Membrane Endothelial Keratoplasty
incl. tube connection for loading the cartridge,
sterile

G-38630

incision 2.8 to 3.0 mm, 14 Gauge / 2.0 mm

G-38635

incision 2.4 to 2.75 mm, 16 Gauge / 1.6 mm



Discover the Complete DMEK Portfolio!

Visit our website to explore the full range of instruments for DMEK.

Specifications and Ordering Information

Composition

1 ml Vioron® contains:

- 0.6 mg trypan blue
- Disodium hydrogen phosphate
($\text{Na}_2\text{HPO}_4 \times 2 \text{H}_2\text{O}$)
- Sodium dihydrogen phosphate
($\text{NaH}_2\text{PO}_4 \times 2 \text{H}_2\text{O}$)
- Sodium chloride (NaCl)
- Water for injection purposes

Density

1.00 g/cm³ at 25 °C

pH value

in physiological range



G-81002 Vioron® Syringe

0.5 ml syringe, 5 pcs. per box, sterile

Literature Keratoplasty

Fajgenbaum MAP, Kopsachilis N, Hollick EJ. Descemet's membrane endothelial keratoplasty: surgical outcomes and endothelial cell count modelling from a UK centre. *Eye (Lond)*. 2018 Oct;32(10):1629-1635. doi: 10.1038/s41433-018-0152-x. Epub 2018 Jun 19.

Lohmann T, Baumgarten S, Plange N, Walter P, Fuest M. Effects of uncomplicated Descemet membrane endothelial keratoplasty on the central retinal thickness. *Graefes Arch Clin Exp Ophthalmol*. 2021 Sep;259(9):2731-2741. doi: 10.1007/s00417-021-05203-2. Epub 2021 May 11.

Trinh L, Bouheraoua N, Muraine M, Baudouin C. Anterior chamber fibrin reaction during Descemet membrane endothelial keratoplasty. *Am J Ophthalmol Case Rep*. 2022 Jan 25;25:101323. doi: 10.1016/j.ajoc.2022.101323.

Literature Capsulorhexis

Ucar F, Kadioğlu E, Seyrek L. The effects of trypan blue use on the corneal endothelium during cataract surgery in patients with pseudoexfoliation syndrome (PEX). *Cutan Ocul Toxicol*. 2021 Dec;40(4):332-337. doi: 10.1080/15569527.2021.1958224. Epub 2021 Aug 3.

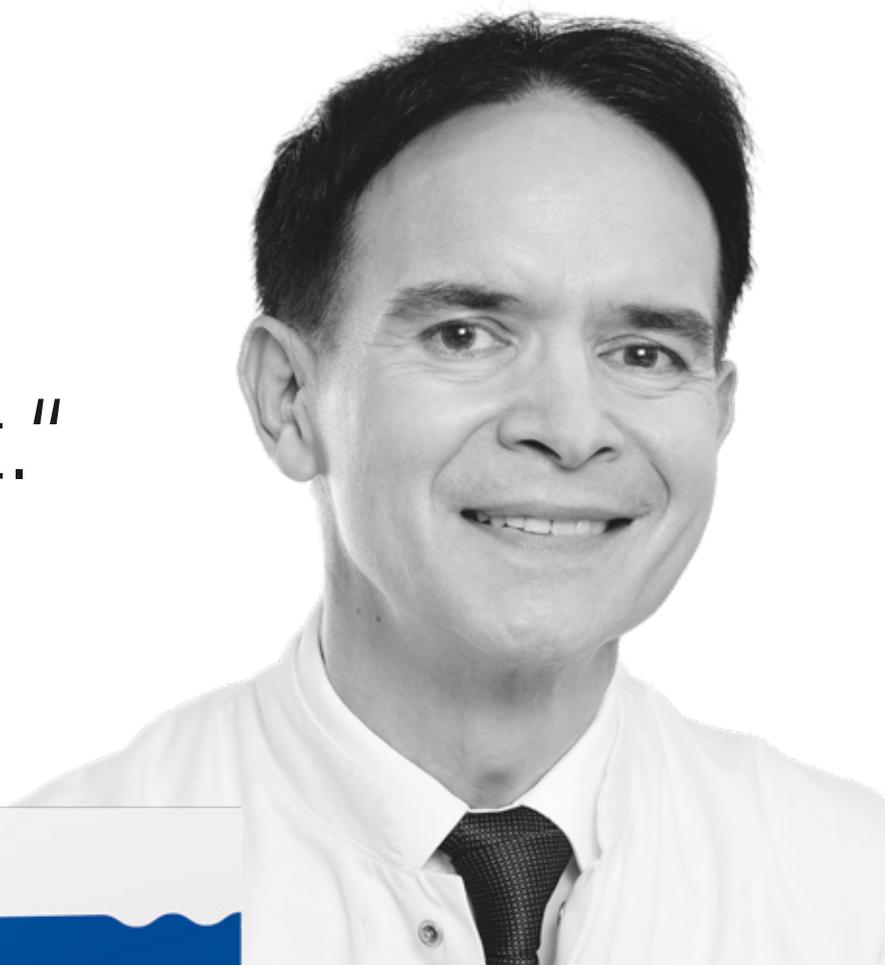
Titiyal JS, Kaur M, Singh A, Arora T, Sharma N. Comparative evaluation of femtosecond laser-assisted cataract surgery and conventional phacoemulsification in white cataract. *Clin Ophthalmol*. 2016 Jul 22;10:1357-64. doi: 10.2147/OPTH.S108243.

Intraocular Dyes

Brilliant Peel®

„Significantly
Improved
Staining Effect.“

Prof. Dr. Lars-Olof Hattenbach, FEBO
Director of the Eye Clinic at Ludwigshafen Hospital

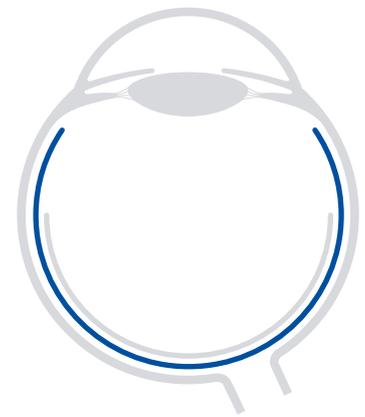


- Contains Brilliant Blue G for selective ILM staining
- Uniform and rapid sinking due to the addition of deuterium oxide
- Formulation without polyethylene glycol (PEG) or aluminum – especially well tolerated.²

ILM

ILM-Peeling Macular Surgery

Brilliant Peel® is a heavy dye for the posterior segment of the eye that enables selective staining of the internal limiting membrane (ILM). Through improved visualization, Brilliant Peel supports safe and complete ILM peeling, reducing the risk of iatrogenic retinal damage. Clinically proven in macular surgery – even for sensitive retina – the dye provides reliable assistance for precise surgical work on the retina.



ready
to use



selective
staining



rapid
sinking



non-
toxic

What Ophthalmic Surgeons Say

„Heavy Brilliant Blue G (BBG-D₂O) results in a significantly improved ILM staining effect, **making ILM peeling more efficient, easier, faster, and less traumatic.**“

Gerding, H., M. Timmermann and N. Thiele. 2011.

„The Brilliant Blue G D₂O staining behavior is practical, **as the dye quickly sinks to the retinal surface and prevents staining in the rest of the posterior segment.** No dye-related complications or signs of toxicity were observed.“

Herriot, P., C. Cywinski, G. Lang, S. G. Priglinger, K. Haritoglou, R. S. Strauss and C. P. Eckardt. 2013.

„Although macular hole closure rates after ILM peeling were similar for BBG and ICG, **stronger visualization was observed in those stained with BBG compared to ICG.**“

Jenisch, T., M. Zeman, M. Koller, D.A. Mörke, H. Heilig and W.A. Herrmann. 2017.

Intraocular Dyes

Brilliant Peel® Dual Dye

„The Perfect Assistant for Safe Peeling“

Prof. Dr. Lars-Olof Hattenbach, FEBO
Director of the Eye Clinic, Klinikum Ludwigshafen

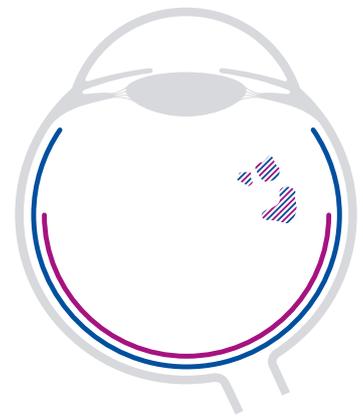


- Uniform and rapid sinking due to the addition of deuterium oxide
- Formulation without polyethylene glycol (PEG) or aluminum – particularly well tolerated
- Free of trypan blue – therefore no unnecessary stress on the retinal tissue while at the same time providing efficient staining

ILM / ERM / Vitreous Remnants

Epiretinal Macular Procedures Removal of Vitreous Remnants

Brilliant Peel® Dual Dye was developed for the specific staining of the internal limiting membrane (ILM) and epiretinal membranes (ERM). The staining enables clear differentiation from the underlying retinal tissue. This simplifies and secures the surgically demanding removal of ILM and ERM. With a density of 1.03 g/cm³, Brilliant Peel® Dual Dye reliably sinks to the fundus without diffuse dispersion throughout the globe.



ready
to use



selective
staining



fast
sinking



non-
toxic

What Ophthalmic Surgeons Say

„**Very good staining** of preretinal membranes and vitreous remnants.“

Head Senior Consultant Dr. Jürgen Steinhauer, University Eye Clinic Witten / Herdecke, KKH Hagen, St. Josefs Hospital

„The outstanding staining properties and impressive sinking behavior make Brilliant Peel® Dual Dye **the perfect tool for safe peeling in epiretinal macular procedures**. Ideal for quick and reliable multiple staining of various membrane components.“

CA Prof. Dr. Lars-Olof Hattenbach, Director of the Eye Clinic at Ludwigshafen Hospital

„Even under yellow UV-IOL, the contour of the retinal nerve fiber layer (RNFL) on the ILM was perfectly visible. A promising new dye with **excellent sinking behavior**.“

Senior Consultant and PD Dr. A. Viestenz, University Hospital of Saarland, Homburg

Comparison of the Dyes Brilliant Blue G (BBG), Indocyanine Green (ICG), and Trypan Blue (TB) for Chromovitrectomy

	Brilliant Peel®	Brilliant Peel® Dual Dye	Other Dyes		
	BBG	BBG & BPB	ICG	TB	Lutein
Chemical Classification	Triphenylmethane	Triphenylmethane	Cyanine	Diazo	Carotenoid
Color	Blue	Violet-Blue	Green	Blue	Yellow-Orange
Dyes	Brilliant Blue G	Brilliant Blue G & Bromophenol Blue	Indocyanine Green	Trypan Blue	Lutein
Ready-to-Use	Yes	Yes	No	Yes	n.a.
Toxicity	No	No	Yes	Moderate	No
Approved	Yes	Yes	No	Yes	Yes
Affinity to ILM	High	High	High	Low	Low
Affinity to ERM	Low	High	Low	High	n.a.
Affinity to Vitreous Remnants	Low	Moderate	Low	Low	High
Staining Time	Short	Short	Short	Long	Short
Fluid Exchange	No	No	No	Yes	No

Literature Brilliant Peel®

Zhmurin R, Grajewski L, Krause L. Influence of Preoperative Foveal Layers' Thickness on Visual Function and Macular Morphology by Phacovitrectomy for Epiretinal Membrane. *J Ophthalmol.* 2022 Aug 25;2022:1895498. doi: 10.1155/2022/1895498.

Friedrich JS, Bleidißel N, Nasser A, Feucht N, Klaas J, Lohmann CP, Maier M. iOCT in der klinischen Anwendung: Korrelation von intraoperativer Morphologie und postoperativem Ergebnis bei Patienten mit durchgreifendem Makulafuramen [iOCT in clinical use: Correlation of intraoperative morphology and postoperative visual outcome in patients with full thickness macular hole]. *Ophthalmologie.* 2022 May;119(5):491-496. German. doi: 10.1007/s00347-021-01527-w. Epub 2021 Nov 4.

Bacherini D, Dragotto F, Caporossi T, Lenzetti C, Finocchio L, Savastano A, Savastano MC, Barca F, Dragotto M, Vannozi L, Nasini F, Faraldi F, Rizzo S, Virgili G, Giansanti F. The Role of OCT Angiography in the Assessment of Epiretinal Macular Membrane. *J Ophthalmol.* 2021 Mar 24;2021:8866407. doi: 10.1155/2021/8866407.

Bleidißel N, Friedrich J, Klaas J, Feucht N, Lohmann CP, Maier M. Inverted internal limiting membrane flap technique in eyes with large idiopathic full-thickness macular hole: long-term functional and morphological outcomes. *Graefes Arch Clin Exp Ophthalmol.* 2021 Jul;259(7):1759-1771. doi: 10.1007/s00417-021-05082-7. Epub 2021 Jan 29.

Ghoraba HH, Leila M, Zaky AG, Wasfy T, Maamoun Abdelfattah H, Elgema EM, Mohamed El Gouhary S, Mansour HO, Ghoraba HH, Heikal MA. Results of Pars Plana Vitrectomy for Different Types of Macular Holes. *Clin Ophthalmol.* 2021 Feb 12;15:551-557. doi: 10.2147/OPTH.S290404.

Ashurov A, Chronopoulos A, Heim J, Schutz JS, Arndt C, Hattenbach LO. Real-Time (iOCT) Guided Epiretinal Membrane Surgery Using a Novel Forceps with Laser-Ablated Microstructure Tip Surface. *Clin Pract.* 2022 Oct 10;12(5):818-825. doi: 10.3390/clinpract12050086.

Habib AM, Mansour A, Fouad YA. Flower-petal inverted flap for internal limiting membrane in myopic eyes with macular hole and rhegmatogenous retinal detachment. *Indian J Ophthalmol.* 2022 Feb;70(2):667-669. doi: 10.4103/ijo.IJO_2226_21.

Bleidißel N, Friedrich J, Feucht N, Klaas J, Maier M. Visual improvement and regeneration of retinal layers in eyes with small, medium, and large idiopathic full-thickness macular holes treated with the inverted internal limiting membrane flap technique over a period of 12 months. *Graefes Arch Clin Exp Ophthalmol.* 2022 Oct;260(10):3161-3171. doi: 10.1007/s00417-022-05676-9. Epub 2022 Apr 27.

Giansanti F, Dragotto F, Nicolosi C, Alonzo L, Cifarelli L, Franco FGS, Vannozi L, Abbruzzese G, Bacherini D, Virgili G. Enhancing Intermediate Vision in Patients Affected by Epiretinal Membrane Treated by Phaco-Vitrectomy. *J Clin Med.* 2023 Jul 30;12(15):5016. doi: 10.3390/jcm12155016.

Tosi GM, Malandrini A, Bacci T, Posarelli M, Oddone C, Virgili G. Vitreous incarceration in sutured vs non-sutured sclerotomies after 25-gauge macular surgery. *Eye (Lond).* 2021 Aug;35(8):2246-2253. doi: 10.1038/s41433-020-01234-x. Epub 2020 Oct 27.

Friedrich J, Bleidißel N, Klaas J, Feucht N, Nasser A, Lohmann CP, Maier M. Großes Makulafuramen – immer eine schlechte Prognose? [Large macular hole – Always a poor prognosis?]. *Ophthalmologie.* 2021 Mar;118(3):257-263. German. doi: 10.1007/s00347-020-01178-3.

Corvi F, Viola F, Germinetti F, Parrulli S, Zicarelli F, Bottoni F, deAngelis S, Milella P, Cereda MG. Functional and anatomic changes between early postoperative recovery and long-term follow-up after combined epiretinal and internal limiting membrane peeling. *Can J Ophthalmol.* 2023 Feb;58(1):52-58.

Literature Brilliant Peel® Dual Dye

Lumi X, Petrovski BE, Petrovski G. Simple new technique for macular pucker peel without forceps. *Front Med (Lausanne).* 2022 Sep 13;9:947578. doi: 10.3389/fmed.2022.947578.

Lorusso M, Micelli Ferrari L, Gisotti EN, Zito R, Bordinone MA, Anna F, Micelli Ferrari T. Success of iOCT in surgical management of ERM peeling. *Eur J Ophthalmol.* 2022 Sep;32(5):3116-3120. doi: 10.1177/11206721221085383. Epub 2022 Mar 11. PMID: 35275025.

Specifications and Ordering Information

Composition

1 ml Brilliant Peel® contains:

- 0.25 mg Brilliant Blue G
- Disodium hydrogen phosphate ($\text{Na}_2\text{HPO}_4 \times 2 \text{H}_2\text{O}$)
- Sodium dihydrogen phosphate ($\text{NaH}_2\text{PO}_4 \times 2 \text{H}_2\text{O}$)
- Sodium chloride (NaCl)
- Deuterium oxide (D_2O)
- Water for injection purposes

Density

1.02 g/cm³ at 25 °C

pH value

in physiological range



G-81010 Brilliant Peel® Syringe

0.5 ml syringe, 5 per box, sterile

Composition

1 ml Brilliant Peel® Dual Dye contains:

- 0.25 mg Brilliant Blue G
- 1.3 mg Bromphenol Blue
- Disodium hydrogen phosphate ($\text{Na}_2\text{HPO}_4 \times 2 \text{H}_2\text{O}$)
- Sodium dihydrogen phosphate ($\text{NaH}_2\text{PO}_4 \times 2 \text{H}_2\text{O}$)
- Sodium chloride (NaCl)
- Deuterium oxide (D_2O)
- Water for injection purposes

Density

1.03 g/cm³ at 25 °C

pH value

in physiological range



G-81015 Brilliant Peel® Dual Dye

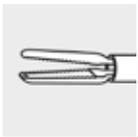
0.5 ml syringe, 5 per box, sterile

Recommended Instruments



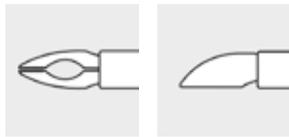
Vitreoretinal Forceps

6 mm titanium handle
blue-colored
overall length 155 mm



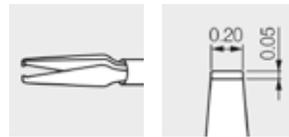
straight
serrated "crocodile" tips

G-36322 25 Gauge / 0.5 mm



TANO
straight, serrated tips

G-36366 25 Gauge / 0.5 mm



straight
endgripping, extra delicate
0.2 mm x 0.05 mm

G-36312 23 Gauge / 0.6 mm

G-37002

Backflush Handpiece

with silicone chamber and
Luer lock connector
Total length 115 mm



Suitable backflush cannulas are available from your **Geuder sales representative** or can be found in the main instrument catalogue



UNO Colorline Handle

20G, 23G, 25G

Titanium handle for UNO Colorline
disposable tips

G-40006 Diameter 6 mm

G-40008 Diameter 8 mm



G-46542

HATTENBACH

Single-Use Vitreous Forceps

Wave Design UNO Colorline

25 Gauge / 0.5 mm

straight, wave design

6 pcs. per box, sterile



G-46541

Single-Use Vitreous Forceps

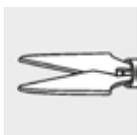
Endgripping UNO Colorline

25 Gauge / 0.5 mm

straight, extra delicate

endgripping

6 pcs. per box, sterile



G-42561

Single-Use Vitreous Scissors

UNO Colorline

25 Gauge

straight

6 pcs. per box, sterile



46562

Single-Use Vitreous Scissors

UNO Colorline

25 Gauge

curved

6 pcs. per box, sterile



Further instruments for vitreoretinal surgery
can be found in our **main instrument catalogue**

F-Octane / F-Decalin

Stable.
Predictable.
Proven.



- High density (1.76 or 1.93 g/cm³) assists in the unfolding of large, bullous retinal detachments
- Low surface tension
- High optical transmittance and chemical stability
- Non-cytotoxic
- Ultra-pure

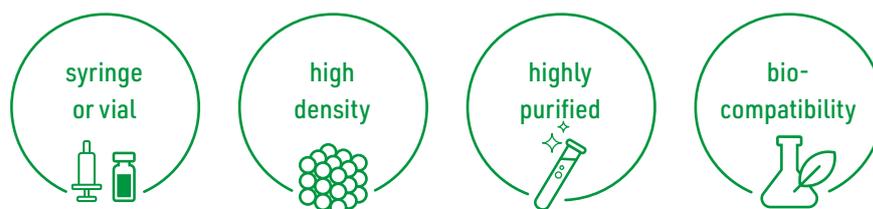
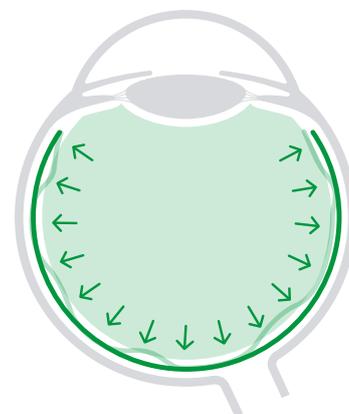
Perfluorocarbons

Retinal Tears / Giant Retinal Tears

Laser Coagulation

Cryotherapy

F-Decalin and F-Octane are reliable intraoperative tamponades that have proven indispensable, especially for large or giant retinal tears. They enable controlled and atraumatic repositioning of the retina and reliably support the surgeon during complex vitreoretinal procedures. Due to their physical properties, both products offer a high level of safety and effectiveness during surgery.



Composition and Properties

F-Octane and F-Decalin are sterile fluorocarbon compounds with high densities (1.76 g/cm³ and 1.93 g/cm³ respectively) that consist solely of C-C and C-F bonds. Due to the complex purification process carried out at Fluoron, they do not contain any relevant quantities of biologically active components. Thanks to the exceptional stability of the C-F bonds, F-Octane and F-Decalin are chemically and physiologically inert and entirely non toxic.

	F-Octane	F-Decalin
Density [g/cm ³] at 25 °C	1.76	1.93
Refractive Index at 35 °C	1.262	1.309
Interfacial Tension [mN/m] at 35 °C	45.9	45.0
Components	Fully Fluorinated Perfluorooctane (PFO)	Fully Fluorinated Perfluorodecalin (PFD)
Cytotoxicity (ISO 10993-5)	Non-Cytotoxic	Non-Cytotoxic

Recommended Instruments



G-33057

CHANG

PFC Cannula

for injection of heavy liquids

double-ended, coaxial

Tip 25 Gauge / 0.5 mm

Tubing 20 Gauge / 0.9 mm



G-34285

Single-Use PFC Cannula

for injection of heavy liquids

double-ended, coaxial

23 Gauge / Ø 0.64 mm

PU 10 pcs, sterile



G-37002

Backflush Handpiece

with silicone chamber
and Luer-Lock connector
overall length 115 mm



G-34289

Single-Use Backflush Handpiece

with silicone chamber, Luer-Lock
10 pcs. per box, sterile



Suitable backflush cannulas are available from your **Geuder sales representative** or can be found in the main instrument catalogue

Ordering Information



- G-80315 F-Octane** Syringe 5 ml, sterile
G-80317 F-Octane Syringe 7 ml, sterile
G-80115 F-Decalin Syringe 5 ml, sterile
G-80117 F-Decalin Syringe 5 ml, sterile



- G-80305 F-Octane** Vial 5 ml, sterile
G-80307 F-Octane Vial 7 ml, sterile
G-80105 F-Decalin Vial 5 ml, sterile
G-80107 F-Decalin Vial 7 ml, sterile



Literature

Literatur: Shi X, Wang WJ, Fan Y, Liu HY, Wang H, Chen YH, Rong A, Wu ZF, Xu X, Liu K. Pars plana vitrectomy for retinal detachment using perfluoro-n-octane as intraoperative tamponade: a multicenter, randomized, non-inferiority trial. *Int J Ophthalmol.* 2024 Jan 18;17(1):82-91. doi: 10.18240/ijo.2024.01.11. PMID: 38239947; PMCID: PMC10754668.

Barth T, Helbig H, Maerker D, Gamulescu MA, Radeck V. Unexplained visual loss after primary pars-plana-vitrectomy with silicone oil tamponade in fovea-sparing retinal detachment. *BMC Ophthalmol.* 2023 Feb 24;23(1):75. doi: 10.1186/s12886-023-02823-6. Erratum in: *BMC Ophthalmol.* 2023 Mar 16;23(1):105. doi: 10.1186/s12886-023-02861-0. PMID: 36829157; PMCID: PMC9951486.

Rizzo S, Tartaro R, Finocchio L, Cinelli L, Biagini I, Barca F, Savastano A, Giansanti F, Virgili G, Caporossi T. Perfluorodecalin as Medium-Term Tamponade in the Case of Retinal Detachment Recurrence With an Inferior Retinal Break, Which Lies Posteriorly to an Encircling Band. *Retina.* 2022 Jun 1;42(6):1203-1210. doi: 10.1097/IAE.0000000000002381. PMID: 30418388.

Barth T, Radeck V, Gamulescu MA, Helbig H, Märker D. Management of macula-on giant retinal tears detachments- outcome of pars-plana-vitrectomy with silicone oil versus gas tamponade. *BMC Ophthalmol.* 2024 Apr 22;24(1):184. doi: 10.1186/s12886-024-03437-2. PMID: 38649837; PMCID: PMC11036693

Gas Tamponades

EasyGas®

„A Prefilled Gas
Tamponade Saves
Valuable Time in the OR
and Provides Safety.“

Dr. Margarita Cabanás Jiménez

Head of Ophthalmology Department at the University Hospital
Virgen del Rocío, Seville, Spain

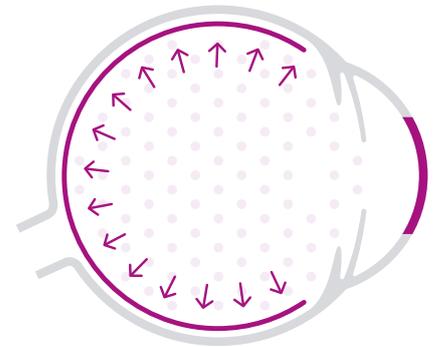


- Precise concentration and sterile ready-to-use mixture
- Time saving and workflow optimization
- Improved patient safety and surgical standardization
- Patented system

Long-Term Tamponades

Macular Holes Retinal Detachments Keratoplasty

The intraoperative use of gas tamponades such as sulfur hexafluoride (SF₆) or hexafluoroethane (C₂F₆) is an established part of vitreo-retinal surgery. However, manual preparation of individual gas-air mixtures in the OR may pose challenges, including potential dosing inaccuracies, surgical workflow delays, and hygiene risks. These factors can affect tamponade quality, surgical flow, and patient safety.



ready
to use



precise
air-gas mixture



sterile
complete system



time
saving

Tamponade and Retention Time

	EasyGas® SF ₆	EasyGas® C ₂ F ₆	EasyGas® C ₃ F ₈
Tamponade Duration* [weeks]	1 – 2	4 – 5	6 – 8
Non-Expansive Gas Concentration* [%]	20	16	12

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„A Prefilled Gas Tamponade Saves Valuable Time in the OR, Reduces Contamination Risks and Gives me the Confidence to Fully Concentrate on the Patient“

Dr. Margarita Cabanás Jiménez

Head of the Department of Ophthalmology at Virgen del Rocío University Hospital, Seville, Spain

Composition and Properties

	EasyGas® SF6	EasyGas® C2F6	EasyGas® C3F8
Composition	20 % SF6 80 % Synthetic Air	16 % C2F6 84 % Synthetic Air	12 % C3F8 88 % Synthetic Air
Gas Purity	≥ 99.99 %	≥ 99.99 %	≥ 99.99 %

Literature

Degenhardt V, Khoramnia R, Storr J, Mayer CS. Intraoperative OCT bei Netzhautablösung mit Makula-beteiligung [Intraoperative OCT in retinal detachment with macular involvement]. *Ophthalmologe*. 2021 Aug;118(8):810-817. German.

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Aljundi W, Abdin A, Suffo S, Seitz B, Daas L. Descemet Membrane Endothelial Keratoplasty (DMEK) in Previously Vitrectomized Eyes: Complications and Clinical Outcomes. *Klin Monbl Augenheilkd*. 2021 Oct;238(10):1101-1107. English.

Specifications and Ordering Information



G-80950 EasyGas® SF₆
Syringe 40 ml, sterile



G-80960 EasyGas® C₂F₆
Syringe 40 ml, sterile



G-80970 EasyGas® C₃F₈
Syringe 40 ml, sterile



Would you like to test EasyGas?

[Order your free sample here!](#)

Recommended Instrument

G-80975
Single-Use Injection Cannula
for EasyGas®
30 Gauge/ 0.3 x 12 mm
100 pcs. per box, sterile



Find more instruments for vitreoretinal surgery in our **main instrument catalog**

Premium Silicone Oil Temponades

Siluron® 2000 and Siluron® Xtra

„The Quality and Purity
of our Oils – Especially
XTRA and 2000 – Meet
the Highest Regulatory
Standards.“

Fabio Lalli Director of Product Management, Geuder AG



- Increased viscosity with optimized injectability
- Extended molecular weight spectrum
- Improved long-term stability
- Excellent chemical purity

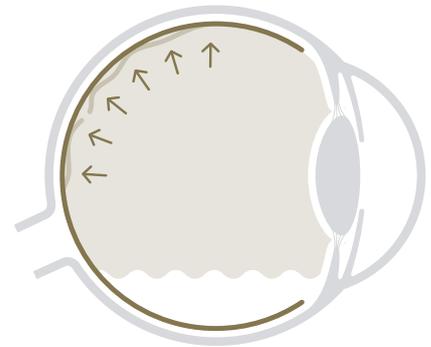
Long-Term Tamponades

Retinal Detachments

Giant Retinal Tears

Vitreoretinal Proliferation

The next generation of Siluron® silicone oils is characterized by a significantly higher resistance to emulsification. This is based on an intelligent mixture of different-length molecular chains, resulting in extensional viscosity. Their excellent injectability through small incisions is another advantage of these innovative silicone oils.



„The quality and purity of our oils – especially Siluron® XTRA and 2000 – meet the highest regulatory standards. Their targeted molecular composition is not a drawback but a functional advantage that has proven itself in daily surgical practice.“

Standard Silicone Oil Temponades

Siluron® 1000 and Siluron® 5000

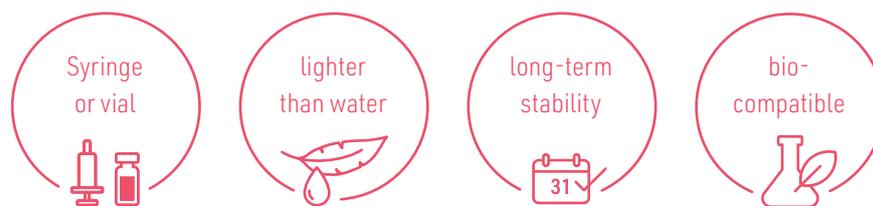
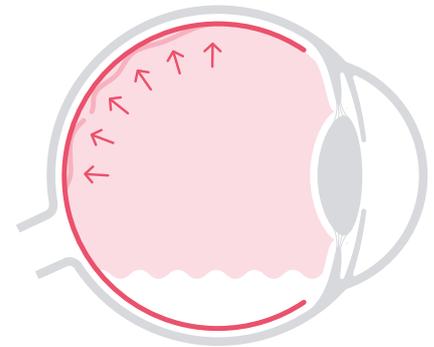
Long-Term Compatible Silicone Oils with Clinically Approved³ Profile and High Stability.



- Good long term compatibility, clinically approved³
- Excellent chemical purity
- Chemically and physiologically inert

Long-Term Tamponades

Rhegmatogenous Retinal Detachment Giant Retinal Tears Vitreoretinal Proliferation



Siluron® 1000 & Siluron® 5000 – Silicone Oils for Safety and Stability in Retinal Surgery

Siluron® 1000 is the first choice for routine procedures in rhegmatogenous retinal detachment. The proven formulation offers reliable endotamponade performance and good flow properties – ideal for efficient use, even with limited OR time.

Siluron® 5000 also offers increased viscosity and is especially suited for high-risk patients with increased tendency to emulsification. Its improved long-term stability can help reduce the risk of postoperative complications that may require reoperation, making Siluron® 5000 a proven solution for complex cases such as secondary or recurrent detachments.

Both products stand for high quality, intraoperative safety and trust – clinically proven for years in vitreoretinal surgery.

Silicone Oil Tamponades

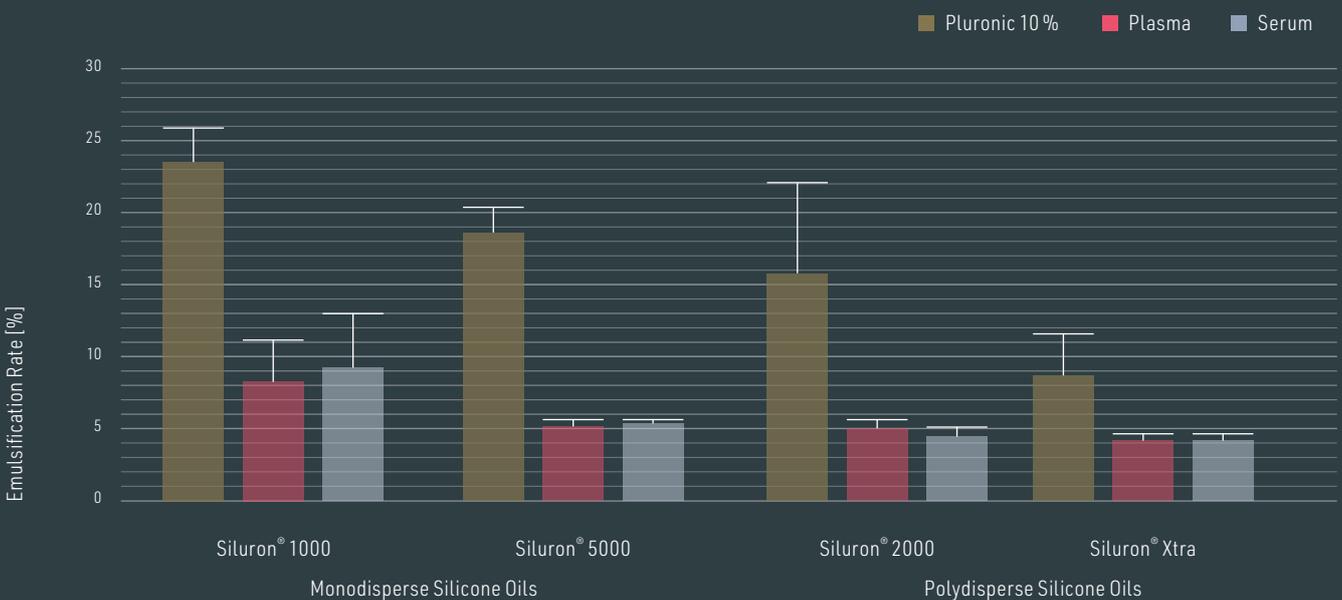
Single-Use VFI Cannulas

Up to Four Times Higher Flow Rate for Silicone Oil Injection and Aspiration.*

* With thin-walled single-use polyimide cannulas compared to reusable metal cannulas

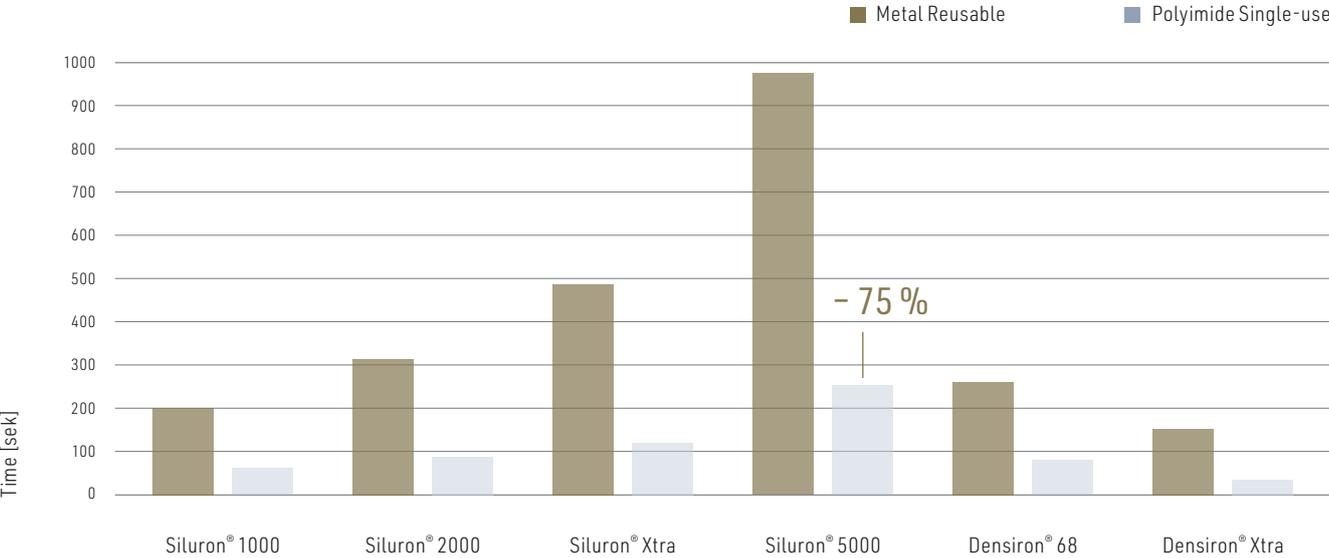


Comparison of Emulsification



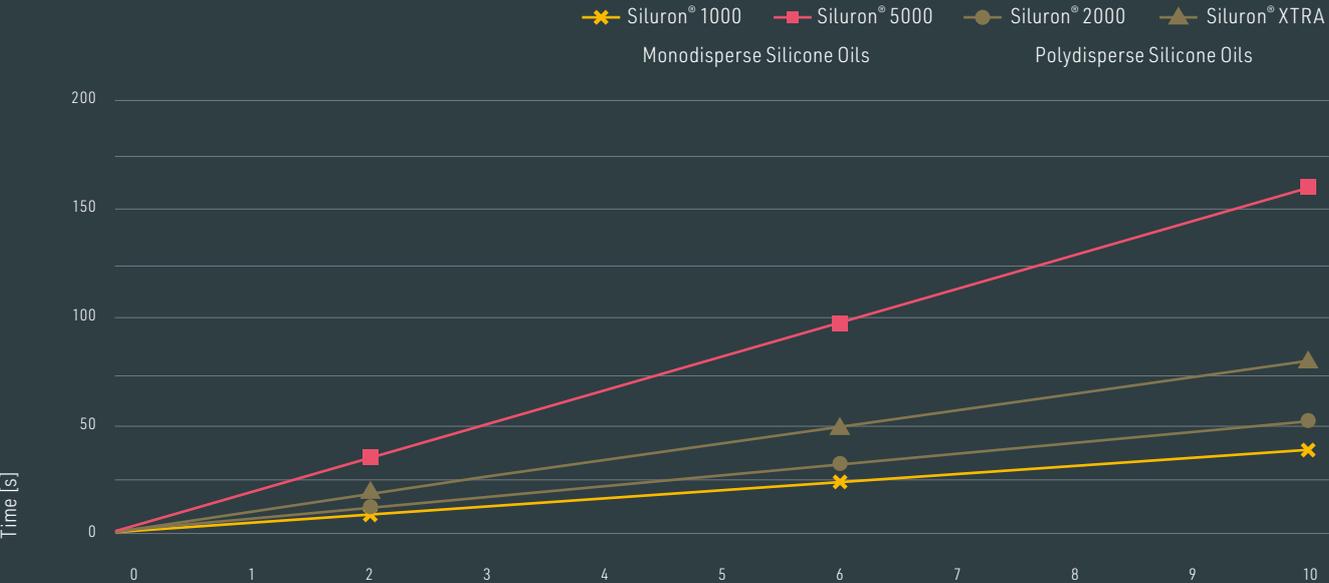
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Comparison of Injection Times: Metal vs. Polyimide Cannulas



Hammer M et al. Retina 2022;42(6):1170-1175

Comparison of Injection Time



Geuder AG test measurements with 1 bar injection pressure and 20 gauge single-use VFI cannula (G-34493)

Physicochemical Properties

Property	Siluron® 1000	Siluron® 5000	Siluron® 2000	Siluron® XTRA
Density (g/cm ³) at 25 °C	0.97	0.97	0.97	0,7
Viscosity (mPa·s) at 25 °C	900 - 1200	4800 - 5500	2000 - 2400	4100 - 4800
Refractive Index	1.404	1.404	1.404	1.404
Solubility in Water	Not Miscible	Not Miscible	Not Miscible	Not Miscible
Composition (w/w %)	100% Poly-dimethylsiloxane (PDMS)	100% Poly-dimethylsiloxane (PDMS)	95% Siluron® 1000 + 5% PDMS (2.5 million mPa·s)	90% Siluron® 1000 + 10% PDMS (2.5 million mPa·s)
Content of Low Molecular Weight Components (LMWC) [%]	< 0.01 %*	≤ 0.2 %	≤ 0.2 %	≤ 0.2 %

* Determined as part of a standardized polymer screening. According to recommended industry standard, content is <0.1 % (< 100 ppm). Our silicones meet the strictest quality requirements.

Validated Purity at the Highest Level

The content of LMWC – particularly low molecular weight oligosiloxanes – is considered a crucial purity parameter of silicone oils. These small molecules are potentially harmful. Validated high-purification processes ensure consistently high-purity product quality and comply with literature recommendations of <100 ppm (Ferrara, M., Steel, D. H. W., Romano, M. R.).

The frequently referenced polydispersity index only describes the size distribution of molecules, not their purity. It is therefore not suitable for evaluating potential contamination by LMWC components.

Ordering Information



G-80720 Siluron® 1000 Syringe 10 ml, sterile

G-80820 Siluron® 5000 Syringe 10 ml, sterile



G-80710 Siluron® 1000 Vial 10 ml, sterile

G-80810 Siluron® 5000 Vial 10 ml, sterile



G-80740 Siluron® 2000 Syringe 10 ml, sterile



G-80750 Siluron® Xtra Syringe 10 ml, sterile



Literature

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Heavy Silicone Oil Temponades

Densiron® Xtra / Densiron® 68

„Densiron showed significantly better reattachment rates and visual outcomes.⁴“

Prof. David Steel, Sunderland Eye Infirmary, England (UK)

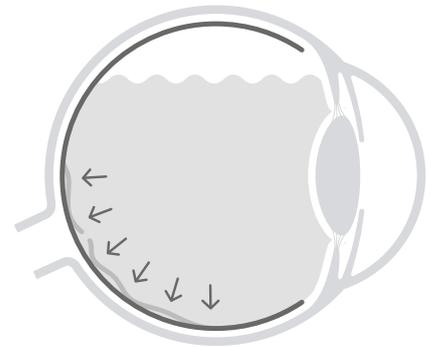


- Unique molecular design
- Excellent chemical purity
- Easy to inject
- High resistance to emulsification

Long-Term Tamponades

Inferior Retinal Detachments PVR / PDR Complex Pathologies

In ophthalmic surgery, Densiron® is used as a postoperative long-term tamponade following surgical treatment of severe inferior retinal detachments. It is also used as a tamponade in macular hole surgery. The tamponade effect was maintained reliably, even over extended periods, thereby enhancing treatment outcomes and reducing the incidence of postoperative complications.



What Ophthalmic Surgeons Say

„An essential surgical tool for all vitreoretinal surgeons dealing with complex pathologies.

It is effective for tamponade and stabilization of the inferior retina and also safe.“

Prof. Francesco Boscia MD, Associate Professor and Chair at the Department of Ophthalmology at the Sassari University, Sassari, Sardegna (IT)

„Densiron Xtra is part of my retinal toolkit and my preferred choice for final tamponades in challenging and complex cases.“

Dr. Vignesh Raja, Joondalup Eye Clinic and Perth Eye Hospital Perth, Australia

„Data from over 1,000 eyes treated with vitrectomy and silicone oil, extracted from the BEAVRS and EURETINA vitreoretinal outcomes database, suggests that eyes where Densiron was used had a significantly improved primary re-attachment rate and visual outcome compared to eyes treated with light oil, matched for a variety of key detachment variables. The difference was particularly marked in the presence of inferior retinal breaks and PVR. In such scenarios, Densiron® should be considered the preferred option⁴.“

Prof. David Steel, Sunderland Eye Infirmary, UK

⁴ Jackson TL et al. Ophthalmology. 2024;131(4):400-410.

[https://www.aaojournal.org/article/S0161-6420\(23\)00899-0/fulltext](https://www.aaojournal.org/article/S0161-6420(23)00899-0/fulltext)

Read the study here

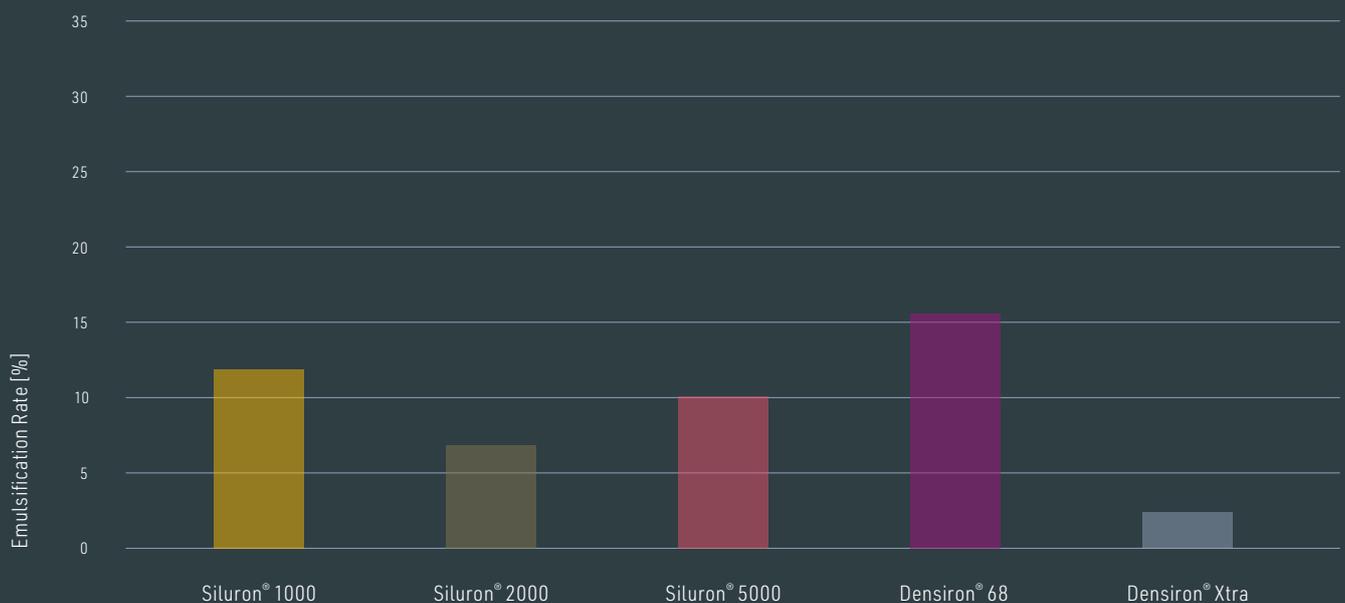


Comparison of Injection Time Densiron® Xtra vs. Densiron® 68



Geuder AG test measurements at 6 bar injection pressure using single-use VFI cannulas (23 Gauge G-34443 and 25 Gauge G-34445)

In Vitro Emulsification of Various Silicone Oils Using Plasma as Emulsifier



Caramoy A, Schröder S, Fauser S, Kirchof B (2010) In vitro emulsification assessment of new silicone oils. Br J Ophthalmol. 94, 509-512

Specifications and Ordering Information

Composition

- 30.5% F6H8°
- 69.5% Siluron° Xtra

Viscosity

1,000 - 1,400 mPa·s at 25 °C

Density

1.06 g/cm³ at 25 °C

pH Value

In physiological range



G-80925 Densiron° Xtra

10 ml syringe,
1 pc. per box, sterile



Composition

- 30.5% F6H8°
- 69.5% Siluron° 5000

Viscosity

1,400 mPa·s at 25 °C

Density

1.06 g/cm³ at 25 °C

pH Value

In physiological range



G-80920 Densiron° 68

10 ml syringe,
1 pc. per box, sterile



G-80910 Densiron° 68

10 ml vial,
1 pc. per box, sterile



Literature Densiron° Xtra

Kurt RA, Kapran Z. Heavy Silicone Oil as an Endotamponade in Recurrent or Complicated Retinal Detachment and Macular Hole. *Turk J Ophthalmol.* 2022 Apr 28;52(2):119-124.

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Literature Densiron° 68

Kurt RA, Kapran Z. Heavy Silicone Oil as an Endotamponade in Recurrent or Complicated Retinal Detachment and Macular Hole. *Turk J Ophthalmol.* 2022 Apr 28;52(2):119-124.

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George Moussa, Maria Tadros, Soon Wai Ch'ng, Mariantonia Ferrara, Dimitrios Kalogeropoulos, Ash Sharma, Kim Son Lett, Arijit Mitra, Ajai K Tyagi, Walter Andreatta. Unexplained visual loss in retinal detachment repair: comparing gas, silicone oil and heavy silicone oil by multivariable regression. *Int J Retina Vitreous.* 2023; 9: 30. Published online 2023 Apr 29.

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Recommended Instruments for Silicone Oils

Up to four times higher flow rate (see p. 31)



HEIDELBERG MODEL

Cannula

for injection or aspiration of viscous fluids and Densiron® 68, bevel 30°

G-32699 19 Gauge / 1.1 mm

G-32698 18 Gauge / 1.2 mm



G-33056

ROIDER

Aspiration Cannula

for viscous fluids

0.7 mm side port

19 Gauge/1.0 mm



Single-Use VFI Cannula for Oil I/A

for silicone oil injection/aspiration

polyimide tip 6 mm, thin-walled

10 pcs. per box, sterile

G-34493 20 Gauge / 0.9 mm

G-34494 23 Gauge / 0.6 mm

G-34495 25 Gauge / 0.5 mm

G-34496 27 Gauge / 0.4 mm



Single-Use Injection Cannula

for viscous fluids

with 1 metal sleeve, Luer-Lock plastic adapter

and 25 cm PVC tube

20 Gauge/0.9 mm

5 pcs. per box, sterile

G-33488 beveled tip, 4.0 mm

G-33489 beveled tip, 6.0 mm

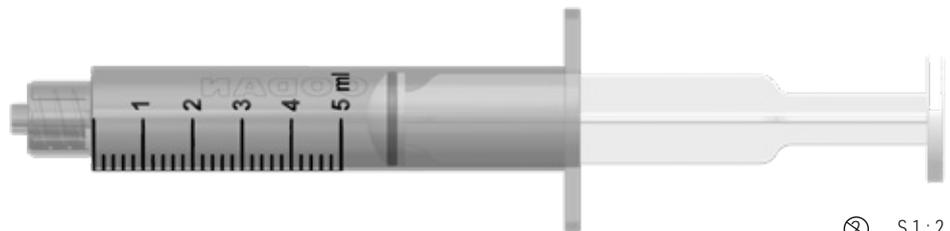
G-62.4717

Single-Use Syringe, 5 ml

Luer Lock, scale 0.2

100 pcs. per box, sterile

CE 0543



Ⓢ S1:2

G-32697

Pressure Tube

for injection of viscous fluids
Luer-Lock female/ male
reusable

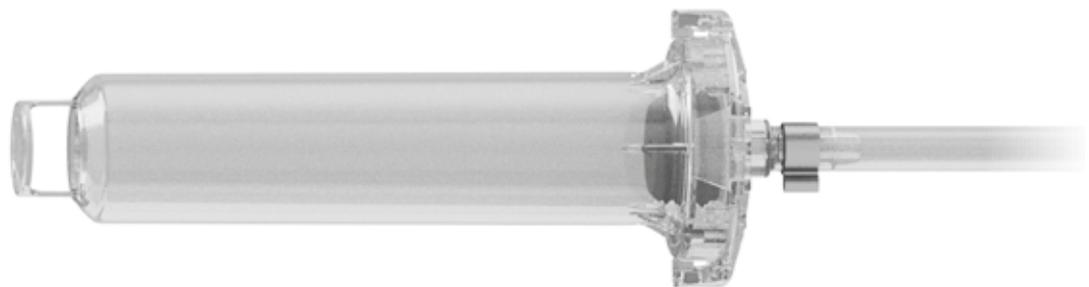


Stopper

for viscous fluid aspiration
with tube connection for single-use syringe

G-33065 for 10 ml syringe

G-33066 for 20 ml syringe



G-28766

Single-Use Oil Injection System

to inject silicone oil pneumatically,
with protective cover for glass syringe,
pressure tube fits megaTRON® S3/ S4 HPS
and Pentasys® 2, sterile

(**G-28767** for megaTRON® and Accurus®, **G-28768** for Millennium®)



* „megaTRON®“ is a registered trademark of Geuder AG | „Pentasys®“ is a registered trademark of Fritz RUCK Ophthalmological Systems GmbH
„ACCURUS®“ is a registered trademark of Alcon Laboratories, Inc. | „Millennium®“ is a registered trademark of MBI Millennium Biomedical, Inc.

Cleaning Solution

F4H5® WashOut

„The Reliable Solution for Silicone Oil Residues.“

Prof. Walid Zbiba

MD, Head of Department of Ophthalmology Faculty of Medicine of Tunis



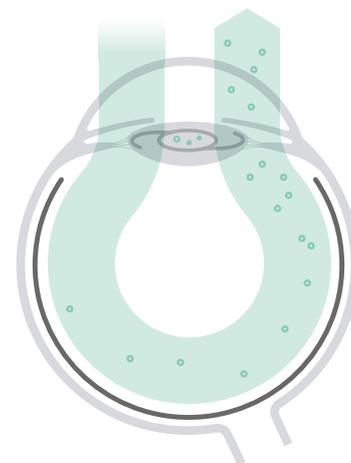
- Unique amphiphilic properties
- Removes silicone oil residues and “sticky oil”
- Cleans silicone-contaminated intraocular lenses
- Patented system
- Excellent chemical purity

WashOut Solution

Cleaning of IOLs

Removal of Silicone Oil Tamponades

F4H5° supports the removal of silicone oil droplets beneath silicone-based intraocular lenses (IOL) as well as the removal of “sticky oil,” thus helping to reduce inflammation in the anterior segment. In addition, F4H5° enables the removal of silicone oil tamponades, thereby potentially reducing the risk of postoperative reactions in the vitreous cavity.



also removes
sticky oil



cleaning of
silicone IOL



bio-
compatible



also available
with syringe



Composition and Properties

Density [g/cm³] at 25 °C: 1.28

Viscosity [mPas] at 25 °C: 0.112

Mix Ratio F4H5° : Silicone Oil:

Mixes in all ratios

Specifications and Ordering Information



G-80615 F4H5° WashOut Vial

5 ml vial, 1 pc. per box, sterile



G-80616 F4H5° WashOut Procedure Pack

contains:

G-80615 F4H5° WashOut, 5 ml Vial, sterile

G-62.4717 Single-use syringe, 5 ml,

Luer Lock, sterile

Literature

Kandarakis SA, Petrou P, Doumazos S, Chronopoulou K, Doumazos L, Halkiadakis I, Georgalas I. Combining Perfluorobutylpentane (F4H5) with Glaucoma Drainage Device Implantation for Silicone Oil-Induced Glaucoma: A Pilot Study. *Turk J Ophthalmol.* 2023 Oct 19;53(5):281-288. doi: 10.4274/tjo.galenos.2023.95825. PMID: 37867479; PMCID: PMC10599334.

In-vitro Study F4H5:

Hammer M, Britz L, Schickhardt S, Lieberwirth I, Munro D, Uhl P, Scheuerle A, Khoramnia R, Labuz G, Auffarth GU. Quantification of Straylight Induced by Silicone Oil Adherent to Intraocular Lenses of Different Materials. *Am J Ophthalmol.* 2023 Nov 26;262:192-198. doi: 10.1016/j.ajo.2023.11.018. Epub ahead of print. PMID: 38016528.

A close-up photograph of an ophthalmic surgeon performing a procedure. The surgeon's hands are visible, one holding a small syringe and the other holding a surgical instrument. The patient's eye is open, and the surgical site is illuminated. The background is a blurred blue surgical drape.

For over 25 years, Fluoron GmbH has been synonymous with excellent solutions in retinal and cataract surgery. As an international leader in the field of high-purity biomaterials, we focus on innovation and precision to support ophthalmic surgeons worldwide. Our team of specialists—including leading scientists and experts in medical technology—works closely together to develop advanced materials that meet the highest quality and safety standards.

Fluoron®

Innovative Fluids for Precise Results.



Fluoron GmbH, based in Ulm, Germany, was founded in 1996 by Prof. Dr. Hasso Meinert and is a sister company of Geuder AG, Heidelberg. With his intellectual property rights, Prof. Meinert laid the foundation for the company's successful development and provided scientific support to Fluoron GmbH for over 10 years. The company is managed by Mr. Volker Geuder.

Fluoron develops and produces highly pure, innovative biomaterials for retinal and cataract surgery. Fluoron plays a leading role worldwide in providing ophthalmic surgeons with creative

and efficient solutions and has been able to consolidate its international competitive position by acquiring extensive property rights. The company's expertise covers all aspects of development, manufacturing, logistics, and regulatory approval.

The comprehensive portfolio includes, among other things, perfluorocarbons and semifluorinated alkanes as temporary tamponades, as well as dyes for anterior and posterior segment surgery.



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