

# Innovative Biomaterials for Retinal Surgery

## Ultrapure fluids



made in Germany



**Geuder**<sup>®</sup>  
Precision made in Germany

**FLUORON**<sup>®</sup>  
Ein Unternehmen der Geuder Gruppe

# Brilliant Peel® Dual Dye

Safer peeling due  
to distinct staining  
of the membrane



Intense and selective staining of ILM and ERM

Fast sinking – maximized contact surface  
with tissue due to higher density

Safe application under air and BSS

Quick and easy application (ready to use)

Physiological osmolarity

Biocompatible

**Brilliant Peel® Dual Dye**

**1.03** g/cm<sup>3</sup>

rapid staining solution  
for intraocular use (sterile)

FLUORON®

FLUORON®

## Composition and properties

**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 ( $\text{D}_2\text{O}$ )
- Water for injection purposes

**Density [g/cm<sup>3</sup>] at 25° C:** 1.03

**pH value** in physiological range

## Packaging units



**G-81015 Brilliant Peel® Dual Dye Syringe**  
0.5 ml syringe, 5 pcs. per box, sterile

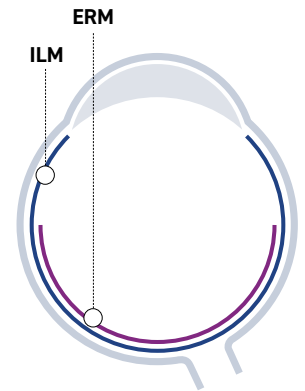
## Video

Scan QR-Code for  
further information on  
Brilliant Peel Dual Dye



## Fields of application

Brilliant Peel® Dual Dye was developed for specific staining of the inner limiting membrane (ILM) and epiretinal membrane (ERM). Specific staining of the ILM and ERM allows them to be clearly distinguished from the underlying retinal tissue, thus making the challenging surgical removal of the ILM and ERM easier and safer. Due to the density of 1.03 g/cm<sup>3</sup> Brilliant Peel® Dual Dye quickly sinks to the fundus of the eye without diffuse dispersion in the whole bulbus.



## Comparison of Brilliant Blue G (BBG), Bromphenol Blue (BPB), Indocyanine Green (ICG), Trypan Blue (TB) and Lutein for Chromovitrectomy

|                                      | Brilliant Peel®<br>Dual Dye           | Other dyes           |             |               |
|--------------------------------------|---------------------------------------|----------------------|-------------|---------------|
|                                      | BBG & BPB                             | ICG                  | TB          | Lutein        |
| Dye class<br>(by chemical structure) | Triphenylmethane                      | Cyanine              | Diazo       | Carotinoid    |
| Color                                | violet-blue                           | green                | blue        | yellow-orange |
| Dyes                                 | Brilliant Blue G &<br>Bromphenol Blue | Indocyanine<br>Green | Trypan Blue | Lutein        |
| Toxicity                             | no                                    | yes                  | moderate    | no            |
| Affinity for ILM                     | high                                  | high                 | low         | low           |
| Affinity for ERM                     | high                                  | low                  | high        | n.a.          |
| Exposure time                        | short                                 | short                | long        | short         |
| Liquid / Gas exchange                | no                                    | no                   | yes         | no            |

Bergamo VC, Caiado RR, Maia A, Magalhães O Jr, Moraes NSB, Rodrigues EB, Farah ME, Maia M (2020) Role of Vital Dyes in Chromovitrectomy. Asia Pac J Ophthalmol (Phila) 10: 26-38

# F-Decalin

Ultrapur  
for intraoperative tamponades



Gentle retinal unfolding and stabilization

Drainage of subretinal fluids

Refloating luxated lenses

Short-term tamponade

Outstanding stability  
and biocompatibility

Ready-to-use syringes

Highly purified

## Packaging units

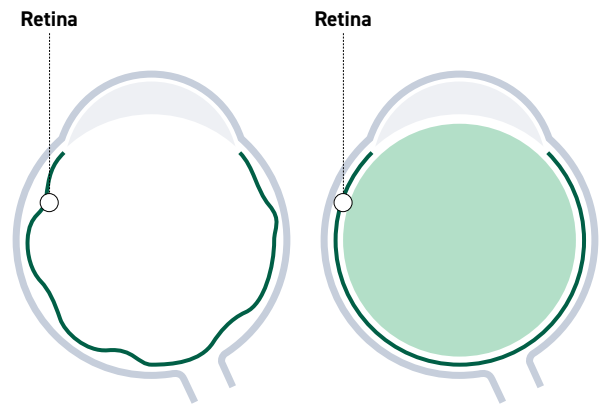


Syringe 7 ml

**G-80117**

## Field of application

F-Decalin is used as medical adjuvants for gentle retinal unfoldings, giant tears, traumata, laser coagulation as well as cryotherapy. Furthermore, it is used for refloating luxated lenses and as short-term tamponades.



## Composition and properties

F-Decalin is sterile fluorocarbon compounds with high density (1.76 g/cm<sup>3</sup> and 1.93 g/cm<sup>3</sup>). it only consist of C-C and C-F bonds and do not contain any relevant amounts of biologically active components. Due to the exceptional strength of the C-F bonds, F-Decalin is chemically and physiologically inert and absolutely non-toxic.

|                                       | F-Decalin                                     |
|---------------------------------------|-----------------------------------------------|
| Density [g/cm <sup>3</sup> ] at 25° C | 1.93                                          |
| Vapor pressure [mbar] at 25° C        | 8.0                                           |
| Refractive index at 20° C             | 1.3110                                        |
| Surface tension [mN/m] at 25° C       | 19.0                                          |
| Interface tension [mN/m] at 25° C     | 57.8                                          |
| Composition                           | completely fluorinated perfluorodecalin (PFD) |
| Cytotoxicity according to ISO 10993-5 | not cytotoxic                                 |

## References

- Chehade LK, Guo B, Chan W, Gilhotra J. Medium-term tamponade with vitrectomy and perfluorodecalin for the management of complex retinal detachments. Eur J Ophthalmol. 2020 Jul 22:1120672120945108. Online ahead of print.
- Fukumoto M, Nishida Y, Kida T, Sato T, Kobayashi T, Ikeda T. A case of silicone oil adhered to the retinal surface via perfluorocarbon liquid. BMC Ophthalmol. 2018;18:82.
- Li J, Zhao B, Liu S, Li F, Dong W, Zhong J. Retrospective comparison of 27-gauge and 25-gauge micro-incision vitrectomy surgery with silicone oil for the treatment of primary rhegmatogenous retinal detachment. J Ophthalmol. 2018;7535043.
- Rejda R, Chorągiewicz T, Moneta-Wielgos J, Wrzesinska D, Borowicz D, Fortini M, Jünemann AG, Nowomiejska K. Intraoperative macula protection by perfluorocarbon liquid for the metallic intraocular foreign body removal during 23-gauge vitrectomy. J Ophthalmol. 2017;6232151
- Yu Q, Liu K, Su L, Xia X, Xu X. Perfluorocarbon liquid: its application in vitreoretinal surgery and related ocular inflammation. Biomed Res Int. 2014;250323

# Siluron<sup>®</sup>

Next generation of silicone oils  
with innovative molecular design

**Siluron<sup>®</sup> 1000**

**1000** mPas

ultrapurified silicone oil  
for intraocular use (sterile)

FLUORON<sup>®</sup>

**Siluron<sup>®</sup> 5000**

**5000** mPas

ultrapurified silicone oil  
for intraocular use (sterile)

FLUORON<sup>®</sup>

Geuder<sup>®</sup>

Good long-term tolerability

Excellent chemical purity

Chemically and physiologically inert

**Siluron<sup>®</sup> 1000**

Easily injectable

**Siluron<sup>®</sup> 5000**

High resistance to emulsification

## Packaging units



**G-80720 Siluron<sup>®</sup> 1000 Syringe 10 ml, sterile**

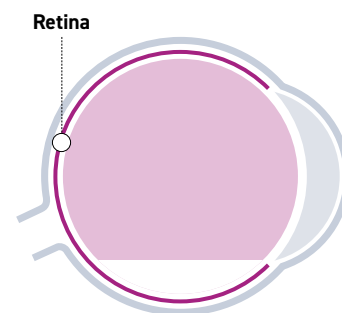
**G-80820 Siluron<sup>®</sup> 5000 Syringe 10 ml, sterile**

## Fields of application

Siluron® silicone oils are used as long-term tamponades after operative treatment of severe retinal detachment, particularly for:

- Retinal detachments with giant tears
- Retinal detachments with proliferative vitreoretinopathy (PVR)
- Retinal detachments in cases of proliferative diabetic retinopathy (PDR)
- Traumatic retinal detachments

Due to their specific density of 0.97g/cm<sup>3</sup> the Siluron® silicone oils float on water.

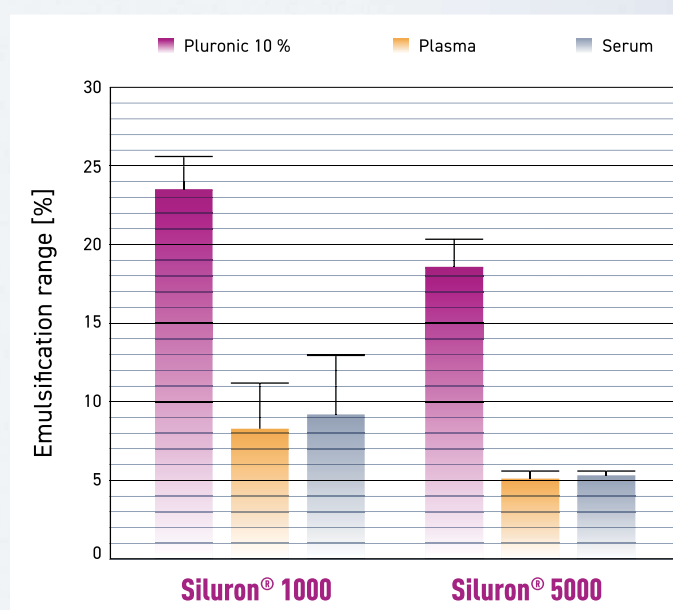


## Physicochemical properties

| Property                               | Siluron® 1000                      | Siluron® 5000                      |
|----------------------------------------|------------------------------------|------------------------------------|
| Density [g/cm <sup>3</sup> ] at 25° C  | 0.97                               | 0.97                               |
| Viscosity [mPas] at 25° C              | 900 - 1200                         | 4800 - 5500                        |
| Refractive index                       | 1.404                              | 1.404                              |
| Solubility in water                    | non miscible                       | non miscible                       |
| Composition [w %]                      | 100 % Polydi-methylsiloxane (PDMS) | 100 % Polydi-methylsiloxane (PDMS) |
| Volatile components (200° C, 24 h) [%] | ≤ 0.2 %                            | ≤ 0.2 %                            |

Caramoy A., Hagedorn N., Fauser S., Kugler W., Gross T., Kirchhof B.: Development of emulsification-resistant silicone oils: can we go beyond 2000 mPas silicone oil? Invest Ophthalmol Vis Sci. 2011; 52: 5432-5436

## Comparison of emulsification



Caramoy A., Hagedorn N., Fauser S., Kugler W., Gross T., Kirchhof B.: Development of emulsification-resistant silicone oils: can we go beyond 2000 mPas silicone oil? Invest Ophthalmol Vis Sci 2011; 52: 5432-5436

# Fluoron

Purity and Variety  
Made in Germany



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 a successful development of the company and accompanied Fluoron GmbH over 10 years on scientific topics. The company is managed by Mr Volker Geuder.

Fluoron GmbH develops and manufactures ultrapure innovative biomaterials for retinal and cataract surgery. In

this field, Fluoron GmbH plays a worldwide leading role in providing ophthalmic surgeons with creative and efficient solutions and consolidated its international competitive position by acquiring extensive intellectual property rights. The company's competence focuses on the development, manufacture and regulatory approval of light and heavy tamponades for retinal surgery, perfluorohydrocarbons and semifluorinated alkanes as temporary tamponades, as well as dyes for anterior and posterior segment surgery.

**Geuder**<sup>®</sup>  
Precision made in Germany

**FLUORON**<sup>®</sup>  
Ein Unternehmen der Geuder Gruppe



**Amico Yasna Pars (Pr.J.S.Co)**

Tel: +9821-71137000 Fax: +9821-71137300  
www.aypmedical.com info@aypmedical.com  
2nd Floor, No. 1698, Shariati Ave., Tehran, Iran  
Postal Code: 1914744755