

*MICROGAS – Sulfur Hexafluoride (SF₆), Hexafluoroethane (C₂F₆), Octafluoropropane (C₃F₈)
Single Kit Gas pure or mixed with Nitrogen, Multiple Kit Gas pure*

Micro Gases (SF₆ - Sulfur Hexafluoride, C₂F₆ - hexafluoroethane and C₃F₈ - Octafluoropropane) are gases of high molecular weight used to replace the vitreous during vitrectomy surgery, with average time of permanence in the eye from 7 to 28 days (SF₆ - 7 days, C₂F₆ - 17 days, C₃F₈ - 28 days).

Gaseous Buffering

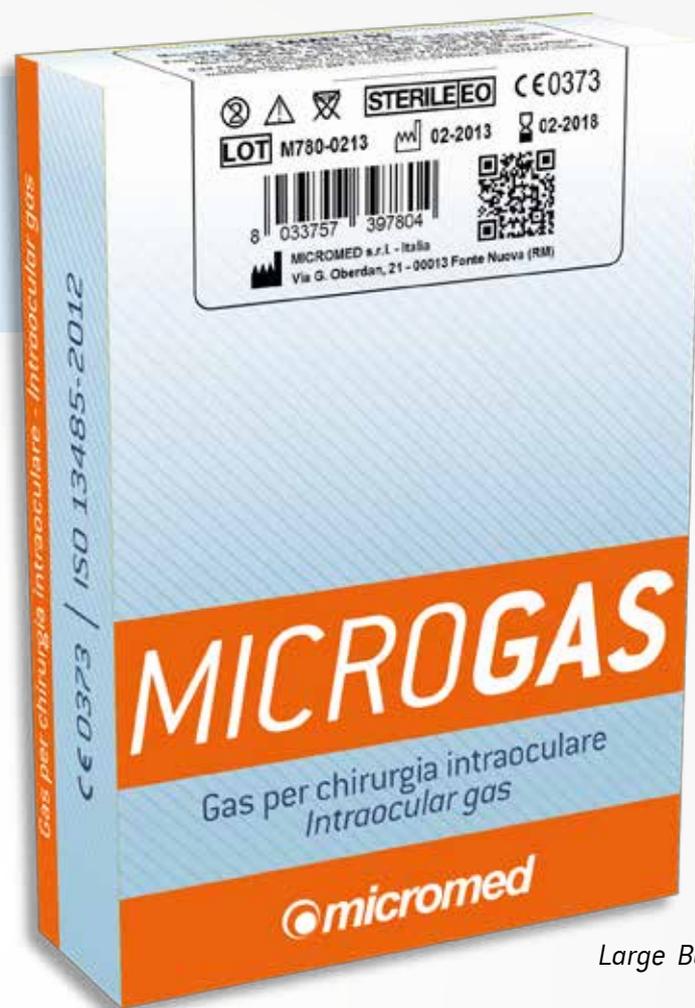
At first, the only buffer used was the air because of the large difference in surface tension which presents towards the water. Unfortunately the air is reabsorbed with ease and often fails to remain in the bulb for all the time necessary to scarring, and therefore have been studied other non-toxic gaseous substances, able to remain in the eye for a longer time.

Were selected fluorine compounds such as Sulfur Hexafluoride (SF₆), or perfluorocarbons as the Perfluoro-Methane (CF₄), Perfluoro-Ethane (C₂F₆), Perfluoro-Propane (C₃F₈) and the Perfluoro-n-Butane (C₄F₁₀).

The gas is inserted in a bubble compact at the end of the intervention of vitrectomy, after a replacement of the liquid with air. The gases contained in the intraocular bubble, go into solution with the adjacent liquids, and over time they leave the eye and spread into the bloodstream. But there is an opposite path, which is that of the gases contained in the blood flow entering the bubble. All this is regulated by the partial pressure of each gas in their environment.

In practice, in the case of a bubble of SF₆, nitrogen and other components of the air will spread towards the bubble devoid of these substances, while the SF₆ will diffuse into the blood (devoid of SF₆). On this mechanism plays a fundamental role the rate of diffusion and while the SF₆ released slowly from the eye, the faster the nitrogen dissolved in the blood will enter the bubble (SF₆ has a molecular weight 5 times more nitrogen). This leads to an expansion of the gas bubble in the eye due to the capture of nitrogen from the blood, up to a maximum beyond which, being the nitrogen pressure now equal to that of the blood, can only be reabsorbed.

This behavior allows the bubble to stay longer in the eye, but with the drawback of give in the early stages of the expansion possibility of dangerous overtones. The drawback described may be avoided by creating a bubble of gas not pure but mixed with nitrogen in order to reduce the rate of diffusion. For each type of gas have been selected and studied the mixings most appropriate to avoid this eventuality.



Large Box

Usage

The buffering gas is inserted in the vitreous cavity after having removed with care the central and peripheral vitreous as it is indeed considered a risk to infuse gas directly into the vitreous. Before infusion, it is recommended anyway to ensure that there is no free vitreous or vitreous that can be pushed by the gas in anomalous positions, especially in aphakic eyes.

It is possible to infuse gas either with a blunt cannula or with the help of a special connector through the infusion cannula inserted in the sclera and normally used to infuse physiologic solution in the eye during vitrectomy.

Due to the fact that it is practically impossible to check if the intraocular pressure is correct (20-40 mmHg.), during the infusion, it is necessary to ensure the correct spraying of the papilla and the possible compression of the optic nerve. In this case infusion should be interrupted immediately.

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TECHNICAL DATA

	SF ₆	C ₂ F ₆	C ₃ F ₈
Formula	[SF ₆]	[C ₂ F ₆]	[C ₃ F ₈]
Molecular weight	146	138	188
Melting point	-50,8 °C	-101° C	-183 °C
Boiling point	-64 °C	-78.2° C	-36,7 °C
Relative density, as gas	5	4.8	6,5
Relative density, as liquid	1,4	1.23	1,4
Vapor pressure @ 20 °C	21 bar	30 bar	7,7 bar
Solubility in water	41 mg/l	ND	ND
Appearance	colorless	colorless	colorless
Odor	none	none	ether
CAS Nr.	62-2	00076-16-4	00076-19-7
C&E Nr.	219-854-2	200-939-8	200-941-9

PRODUCT LINE AND CODES

	SF ₆		C ₂ F ₆		C ₃ F ₈	
Product Line	MMD-781	Pure	MMD-785	Pure	MMD-788	Pure
	MMD-780	20%	MMD-784	16%	MMD-787	12%

KIND OF PACKAGING

Package	Canister precharged with 50ml gas pure or mixed with Nitrogen, not sterilized, to be filtered with filter included Envelope content (Precharged Canister, 50ml Plastic Syringe, Filter, Three-way Cock, 27G and 30G Needles) sterilized at Ethylene Oxide Large Carton Box (120x170x40)mm
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