



ENT and Head & Neck Surgery

Solutions with the CURIS® 4 MHz Radiofrequency Generator











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CURIS® 4 MHz Radiofrequency Generator One unit – many applications

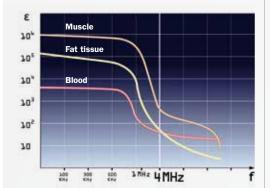


The CURIS® 4 MHz radiofrequency generator relies on innovative 4 MHz technology: It is gentle to the tissue and effective for coagulation, for submucosal shrinkage, and for cutting. Scientific studies have shown that tissue trauma may be reduced by using CURIS® 4 MHz radio-frequency technology.1

CURIS® 4 MHz Radiofrequency Technology

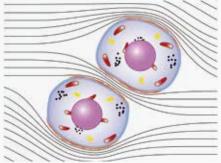
The higher the frequency, the less the resistance of biological tissue to electromagnetic fields up to the point where cell membranes are capacitively coupled. This effect is created by the CURIS® 4 MHz radiofrequency generator in all monopolar and bipolar modes. When using conventional electrosurgical units the electromagnetic field mainly concentrates between the cells and only heats up the outer layer. However, with the CURIS® 4 MHz radiofrequency generator cell membranes are conductive, and energy is absorbed evenly inside the cells.² As a result, energy is administered gently and in a highly focused fashion. Precise monopolar cuts are possible while lateral heat damage is kept to a minimum.3

Permittivity/Frequency



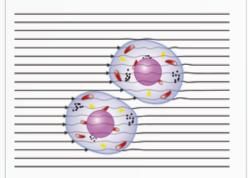
This diagram shows the permittivity of tissue. which depends on the frequency of the electromagnetic field.

Conventional electrosurgical units



The electromagentic field concentrates mainly between the cells and heats up only the outer layer.

CURIS® 4 MHz Radiofrequency Generator



Cell membranes are conductive and the energy is absorbed evenly inside the cells. The result are highly focused tissue effects.

Source: [2] Holder

¹ Muehlfay G et al. A study on the type of lesions achieved by three electrosurgical methods and their way of healing. Romanian Journal of Morphology & Embryology. 2015; 56(4): 1383-1388

² Holder DS. Electrical Impedance Tomography-Methods, History and Applications. IOP Publishing Ltd. 2005

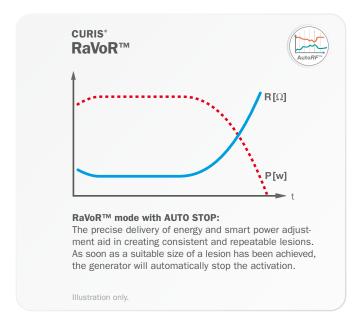
³ Hoffmann TK et al. Comparative analysis of resection tools suited for transoral robot-assisted surgery. European Archives Oto-Rhino-Laryngology. 2014: 271 (5): 1207-1213

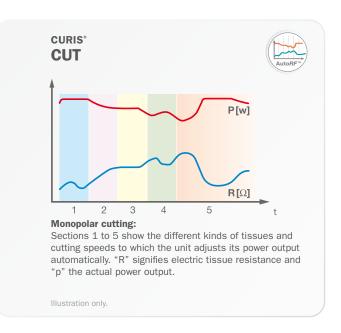
Precision thanks to **AutoRF**™



AutoRF™ is a smart impedance control function that will tailor the power output of the CURIS® 4 MHz radiofrequency generator to the tissue condition. Whether it is cutting through different types of tissue (such as mucosa, muscle, fat or connective tissue) or altering tissue conditions during coagulation, the AutoRF™ feature will deliver adapted power output as required by the different tissue impedance.

When dissecting different types of tissue in one cut (skin, fat, muscles), the unit has to process and respond to the AutoRF™ data in a flash. For this reason, the CURIS® 4 MHz radiofrequency generator has two microprocessors for additional safety and speed.





p^{3™} Technology

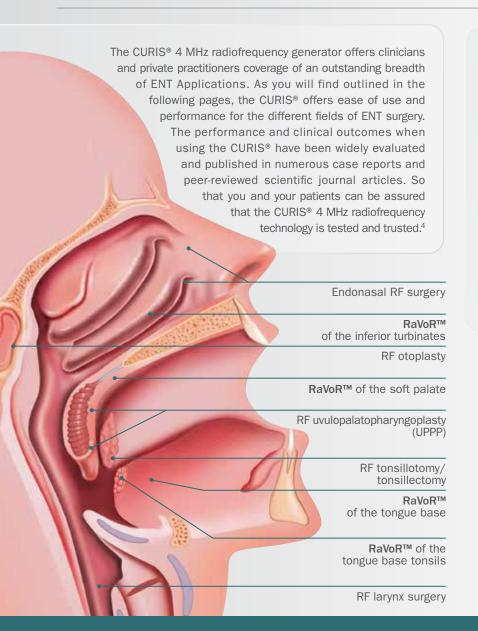


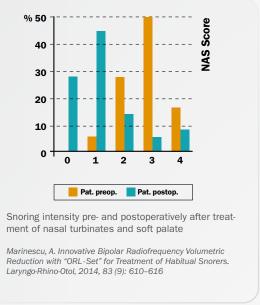
p³™, which stands for pulsed power performance, is active in all coagulation modes of the CURIS® 4 MHz radiofrequency generator. Radiofrequency energy is delivered in about 50 small packages per second. Due to the pulsed power output, there are short breaks between the individual packages, giving the tissue enough time to absorb the energy. Highly focused, yet gentle coagulation with minimal thermal damage is possible.



CURIS®: one device - many applications

Versatility in ENT





RaVoR™

Radiofrequency Volume Reduction

Bipolar radiofrequency volumetric tissue reduction, using Sutter technology, appears to have promising results for patients with snoring and mild OSA. One treatment session resulted in significant reduction in snoring intensity, improvement in sleep quality and QOL, and reduction in daytime sleepiness.

Pang et al. Sutter bipolar radiofrequency volume reduction of palate for snoring and mild obstructive sleep apnea. The Journal of Laryngology & Otology. 2009; 123: 750-754

RaVoR™ Radiofrequency Volume Reduction

RaVoR™ of the inferior turbinates, soft palate, tongue base, etc. is an interstitial application for submucosal tissue shrinkage. Precise delivery of energy and smart power adjustment depending on actual tissue impedance aid in creating consistent and repeatable lesions. As soon as a suitable size of a lesion has been achieved, the CURIS 4 MHz radiofrequency generator will automatically stop the activation (AUTO STOP mode), and give an acoustic signal. The treated tissue is decomposed and transformed into fibrous scar tissue. This process leads to a shrinkage and stiffening of the treated area.

Sutter has developed different bipolar electrodes for the treatment of sleep-related breathing disorders based on the anatomical sites of obstruction.

Audio Feedback

If desired, an acoustic feedback function (AUDIO FEEDBACK) can be activated. While a lesion is created in RaVoR™ mode, the change in tissue condition is signaled by a changing pitch: The further the lesion progresses, the higher the activation sound. This mode may also be used to potentially increase the patient's comfort. The patient will be able to listen and follow what happens inside the tissue.

⁴ Brumann M et al. Comparison of Functional Expansion Pharyngoplasty with Radiofrequency Volume Reduction of the Soft Palate in Surgery for Sleep-related Breathing Disorders. Journal of Sleep Medicine & Disorders, 2017; 4(1):1073

Basterra J et al. Eighty-three cases of glottic and supraglottic carcinomas (stage T1-T2-T3) treated with transoral microelectrode surgery: how we do it. Clinical Otolaryngology. 2011 Oct; 36(5):500-4 Additional references available upon request.

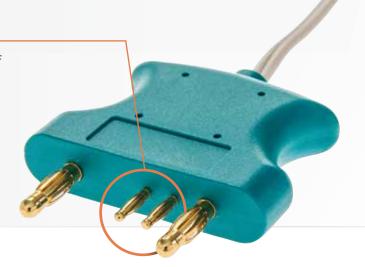
RaVoR™ bipolar electrodes

single-use



Plug and operate

- Convenient handling for surgeon and staff
- · Perfect match with the CURIS® 4 MHz radiofrequency generator
- · Auto recognition of the instrument and instant selection of the RaVoR™ program
- CURIS® Precision thanks to AutoRF™



RaVoR™ of the inferior turbinates





"Ra VoR^{TM} is a modern surgical technique showing good and long-lasting treatment results when used to reduce the volume of hypertrophic turbinates. At the same time it preserves the mucosa and its function."

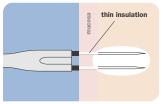
R. Romeo, MD Rome (Italy)





Inferior turbinate – preoperative condition and six months postoperatively with significantly enlarged nasal passage.*4





Schematic view of the puncture sites for the application of radiofrequency energy of the hypertrophic turbinates.

Additional products for the treatment in the nose



71 50 15

non-stick monopolar suction tube Ø 3.3 mm, lumen 2.0 mm, working length: 13 cm

71 50 19

non-stick monopolar suction tube, malleable, \emptyset 4.3 mm, lumen 3.0 mm, working length: 13 cm



36 08 17

Monopolar ball electrode

Ø 3 mm, total length: 60 mm

36 04 62

Monopolar ball electrode

Ø 4 mm, total length: 142 mm



78 21 81 SG

SuperGliss® non-stick bipolar forceps

bayonet, tips: 1.0 mm

total length: 20.0 cm, working length: 8.5 cm

^{*4} Courtesy of R. Romeo, MD, Rome (Italy)

RaVoR™ of the soft palate





"The radiofrequency assisted soft palate procedure is a minimally invasive, safe and quick procedure. It is well tolerated by patients. We have not observed any bleeding that needed special attention."

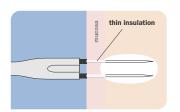
D. Brehmer, MD Göttingen (Germany)



Puncture sites for the application of radiofrequency energy in the soft palate.



Dissection of surplus uvula tissue and incision lines for the triangular excision of the posterior palatal pillars (with $\mathsf{ARROW} \mathit{tip}^{\mathsf{TM}} \, \mathsf{monopolar} \, \mathsf{microdissection}$ electrode, REF: 36 44 42).



Additional products for the treatment of the soft palate/ UPPP single-use 78 01 75 SG $\mathbf{ARROW} tip^{\mathsf{TM}}$ monopolar microdissection electrode, single-use SuperGliss® non-stick bipolar forceps Ø 0.3 mm, 45° angled straight, tips: 1.0 mm, 30° angled total length: 103 mm total length: 20.0 cm, working length: 6.0 cm

RaVoR™ of the tongue base





"In my clinical practice I successfully make use of the tongue base radiofrequency procedure. My experience shows that when using this minimally invasive method together with other surgical techniques, the outcome of sleep-related breathing disorder surgery can be improved. The treatment is useful and should be considered in the treatment of patients with tongue base collapse."

M. A. Sarte, MD Manila (Philippines)



Puncture sites on the tongue base for the application of radiofrequency.



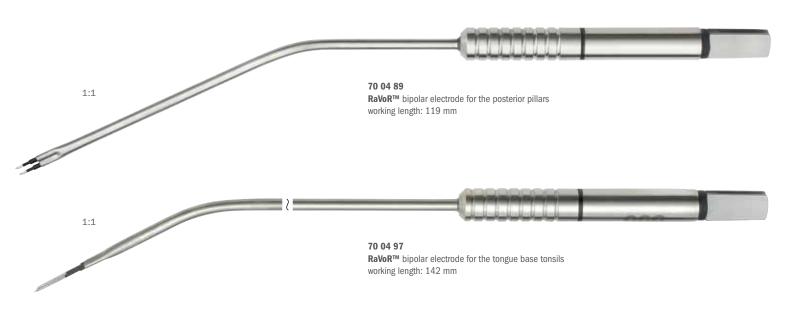
The low profile of the instrument and its strong shaft enable the surgeon to insert the bipolar electrode at the back of the tongue.

RaVoR™/ENT bipolar electrodes









ARROWtip[™]

monopolar microdissection electrodes

single-use



Sutter offers a range of different models to meet your needs for a variety of applications.

Precision and versatility

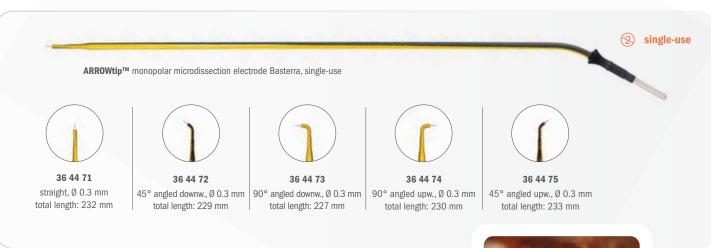
- Ultra-sharp tips for clean and precise dissection of tissue
- Heat-resistant material maintains tip sharpness
- High-performance insulation prevents accidental burns
- Hexagonal shape prevents unwanted rotation of the electrode

Possible Applications:

- Tonsillotomy
- UPPP
- Oral and oralpharyngeal tumors
- · Endoscopic ear surgery
- Sinus surgery
- Larynx surgery

- Skin incisions
- Skin tumors
- · Changes in the skin structure
- Blepharoplasty
- Facelifts

Radiofrequency in Larynx Surgery





"Compared to laser procedure, microelectrodes used with radiofrequency enhance the surgical technique by giving tactile feedback and other advantages.

No special safety precautions are necessary and scarring is similar in both procedures. Made of super-hard tungsten and especially designed to reach every part of the laryngeal anatomy, micro-tips in different angles allow good access to the surgical field. We have operated on 92 tumors, mainly T1 glottic tumors, using the ARROWtip™ monopolar microdissection electrodes."

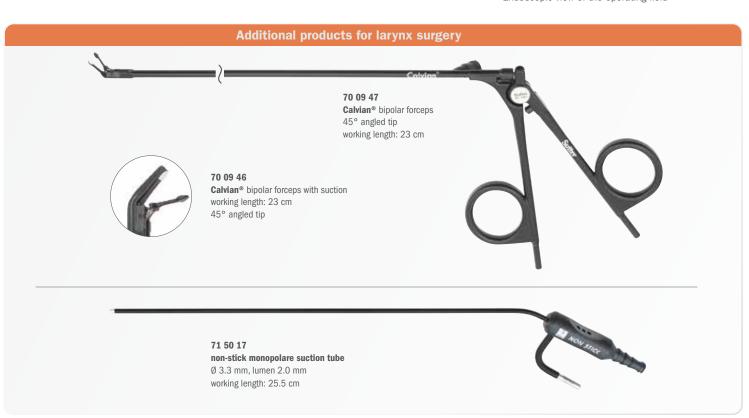
Prof. J. Basterra Valencia (Spain)



Cordectomy type V. Arrow indicates internal surface of thyroid cartilage



Endoscopic view of the operating field



Radiofrequency Tonsillotomy





"Tonsillotomy with radiofrequency is a safe and easy-to-learn procedure. Children with symptomatic tonsillar hyperplasia profit from it enormously. Compared to all other procedures for removing parts of or even all tonsillar tissue we prefer radiofrequency tonsillotomy for children with symptomatic tonsillar hyperplasia without chronic tonsillitis."

R. Hirt, MD Dessau (Germany)



The protruding part of the tonsil is cut along the incision line and parallel to the palatal pillar.



Surgical site during radiofrequency



Radiofrequency Tonsillectomy





"The To-BiTE non-stick bipolar clamp combining four functions in one instrument is a safe and effective tool for performing tonsillectomies. Vis-à-vis the traditional approach, it seems to make tonsillectomies faster and easier."

P. Tolsdorff, MD **Bad Honnef (Germany)**



Dissection of the tonsillar tissue



Wound immediately after tonsillectomy

Additional products for the tonsillectomy



70 08 26

Bipolar suction forceps (for tonsillectomy)

tips: 3.0 x 4.5 mm with selectal® tips total length: 20.5 cm, working length: 10.0 cm $\,$



78 01 75 SG

SuperGliss® non-stick bipolar forceps straight, tips: 1.0 mm, 30° angled total length: 20.0 cm, working length: 6.0 cm 78 01 76 SG

SuperGliss® non-stick bipolar forceps straight, tips: 2.0 mm, 30 $^{\circ}$ angled total length: 20.0 cm, working length: 6.0 cm



36 04 40

Monopolar blade electrode total length: 68 mm

Radiofrequency in Oral and Oropharyngeal Tumor







"Radiofrequency excision of lesions in the oral cavities (tongue, tongue base, buccal mucosa, lips or base of the mouth) such as benign and malign tumors as well as precancerous lesions is a gentle and very easy treatment which can be done under local anesthesia."

S. Arndt, MD; E. Heinert, MD, Freiburg (Germany)



Sublingual papilloma on the right side



Reduced-bleeding excision of the papilloma with ARROWtip monopolar microdissection electrode (REF 36 03 22)



Postoperative site after precise and full tumor resection

Additional products for oral and oropharyngeal surgery 36 08 14 78 01 75 SG Monopolar loop electrode $\textbf{SuperGliss} @ \textbf{non-stick} \ bipolar \ forceps$ Ø 5 mm straight, tips: 1.0 mm, 30° angled total length: 57 mm total length: 20.0 cm, working length: 6.0 cm

Radiofrequency in Sinus Surgery





"Endoscopic endonasal sinus surgery demands subtle hemostasis and the precise cutting performance of the instruments employed. The disadvantages of "cold steel" can be levelled out favorably by the application of radiofrequency current through an angled probe."

T. Kühnel, MD Regensburg (Germany)



The uncinate process incised and lifted anteriorly. Arrow (a) indicates the incised anterior edge, arrow (b) indicates posterior margin.



Incision starting at the cranial attachment of right uncinate process utilizing ARROWtip™ monopolar microdissection electrode (REF: 36 44 42)



The posterior part of the uncinate process can be incised by means of the angled tip. No deterioration of the inferior turbinate.



Nearly bloodless incision at the anterior edge of the uncinate process.

Additional products for sinus surgery 70 09 39 70 09 38 Calvian® duckbill+ bipolar forceps with suction Calvian® duckbill+ bipolar forceps with suction 45° angled tip working length: 12 cm working length: 12 cm

Radiofrequency treatment of Epistaxis







"Blood vessels on the surface of the nasal mucosa are often the cause for recurrent nasal bleeding. Radiofrequency coagulation (RF coagulation) is a new method for the treatment of such vessels with the advantage of causing less thermal damage to the surrounding mucosa. Recurrent epistaxis predominantely occurs in Osler's disease. Despite a broad armamentarium of treatment methods, successful therapy in this patient group is difficult to achieve. RF coagulation is an inexpensive alternative to laser treatment, and preliminary results are promising."

B. J. Folz, MD; C.-G. Konnerth, MD Lippspringe (Germany)



Patient with Rendu-Osler-Weber syndrome, preoperative findings



Intraoperative view during radiofrequency treatment of nasal hereditary hemorrhagic telangiectasia



Result of radiofrequency treatment six months postoperatively

Additional products for epistaxis 71 50 10 non-stick monopolar suction tube Ø 4.0 mm, lumen 2.8 mm working length: 13 cm

Radiofrequency in Endoscopic Ear Surgery





"Endoscopic ear surgery is rapidly gaining interest. With one hand holding a camera, bleeding control and hemostasis can be a challenge. With the use of the Sutter ARROWtip monopolar microdissection electrodes bleeding can be significantly reduced from the outset, optimizing visibility and reducing operation time."

S. Geukens, MD Aalst (Belgium)



Intraoperative picture showing outer ear canal with an ARROWtip™ monopolar microdissection electrode



Application of radiofrequency ablation at carefully selected points

Additional products for endoscopic ear surgery 70 09 59 Calvian endo-pen® bipolar forceps tips: 0.7 mm, 15° angled total length: 23.0 cm, working length: 10.0 cm

SuperGliss® non-stick bipolar Forceps

The material specially developed for SuperGliss® non-stick bipolar forceps prevents overheating of the tips during coagulation. Laboratory tests* confirm the outstanding non-stick properties that last throughout the lifetime of the instrument.



Bipolar suction forceps

Our bipolar suction forceps, specially adapted to the anatomy, enable clean suctioning before coagulation. They offer a suitable solution for various ENT applications, e.g. for adenotomy and tonsillectomy.



CURIS® Storage / Transport



36 09 00 Fuego trolley



The trolley has a solid design and enables that the CURIS® 4 MHz radiofrequency generator will not shift. It also comes with a hook to mount the footswitch. Two storage baskets for accessories and documentation.



99 01 10 **CURIS®** trolley case

Trolley case for CURIS® 4MHz radiofrequency generator

The CURIS® trolley case is ideally suited to preserve your radiofrequency generator from damage. Not for shipment with parcel services.

CURIS® Technical Data

RF output max.	performance	operating frequency		
monopolar CUT 1 (unmodulated) CUT 2 (modulated) CONTACT (Coag) SOFTSPRAY (Coag)	100 W ± 20 % 600 Ω 80 W ± 20 % 600 Ω 80 W ± 20 % 400 Ω 60 W ± 20 % 600 Ω	4.0 MHz 4.0 MHz 4.0 MHz 4.0 MHz	Modulation frequency Mains supply 100-240 V; 50/60 Hz Measurements W x H x D Weight Mode of operation Intermittant INT 10 s / 30 s equals 25 % ED	
bipolar BICUT 1 BICUT 2 EXCISE (Cut) MACRO (Coag) PRECISE (Coag) RaVoR™	$80 \text{ W} \pm 20 \text{ % } 300 \Omega$ $80 \text{ W} \pm 20 \text{ % } 300 \Omega$ $80 \text{ W} \pm 20 \text{ % } 300 \Omega$ $80 \text{ W} \pm 20 \text{ % } 50 \Omega$ $50 \text{ W} \pm 20 \text{ % } 50 \Omega$ $40 \text{ W} \pm 20 \text{ % } 50 \Omega$	4.0 MHz 4.0 MHz 4.0 MHz 4.0 MHz 4.0 MHz 4.0 MHz	Standards Safety class I EMC (Interference suppr.) Type German MPG class. Quality assurance	Safety class I EMC (Interference suppr.) EN 60601-1-2 Type CF (cardiac floating) defibrillation proof German MPG class. II b

Technical data valid from generator version 0604

The information presented herein has been carefully researched and compiled with the help of specialist physicians. They are not meant to serve as a detailed treatment guide. They do not replace the user instructions for the medical devices used. Sutter accepts no liability for the treatment results beyond the mandatory legal regulations.

The listed working lengths serve as a guideline and may be rounded up or down. The actual lengths may vary slightly.

Products shown in this catalog are subject to regulatory approval in individual markets. Products may therefore not be available in all markets.

CURIS ® commonly used unit settings*

Possible Application	Possible Instrument	Suggested Unit settings
ENT		
$RaVoR^TM$ of the Inferior Turbinates	RaVoR™ bipolar electrode for the inferior turbinates, single - use REF 70 44 62	RaVoR™ (AUDIO FEEDBACK) 8 - 10 watts
RaVoR™ of the Soft Palate	RaVoR™ bipolar electrode for the soft palate, single - use REF 70 44 95	RaVoR™ (AUDIO FEEDBACK) 10 watts
RaVoR™ of the Tongue Base	RaVoR™ bipolar electrode for the tongue base, single-use REF 70 44 99	RaVoR™ (AUDIO FEEDBACK) 12 watts
UPPP	ARROW <i>tip</i> ™ monopolar microdissection electrode, single - use REF 36 44 42	CUT 2 12 - 20 watts
Tonsillotomy	ARROW <i>tip</i> ™ monopolar microdissection electrode, single - use REF 36 44 42 Monopolar electrode for RF tonsillotomy REF 36 03 65 SuperGliss® non-stick bipolar forceps REF 78 01 75 SG	
Tonsillectomy with To-BiTE™ non-stick	То-ВптЕ™ non-stick bipolar clamp REF 70 09 60 SG	MACRO 30 - 40 watts
Laryngeal tumors	ARROW <i>tip</i> ™ monopolar microdissection electrodes, single - use REF 36 44 71 - 75	CUT 2 5 - 25 watts
Epistaxis	Monopolar ball electrodes REF 36 08 17 OR 36 04 62	CONTACT 8 - 12 watt

Settings valid for generators from version: 0604

CURIS® Basic Equipment



^{*}Please see disclaimer on page 18. Values are recommendations only and may be changed at the discretion of the physician!

