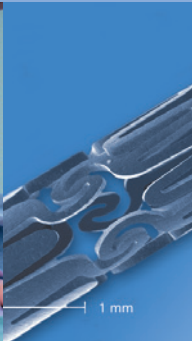


# A PERFECT CONNECTION

■ MEDICAL DEVICE TECHNOLOGY ■ LASERS ■ ROFIN



WE  
THINK  
LASER

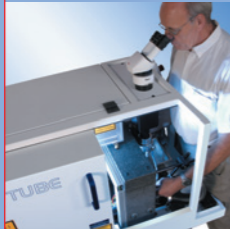
Laser technology and application development are keys to success



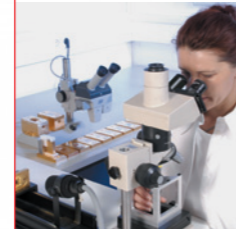
Lasers in the medical device technology

Miniaturization is the key to success in the medical device technology

Innovative solutions are the result of working closely with the client



High-precision quality assurance



Competence in customized solutions

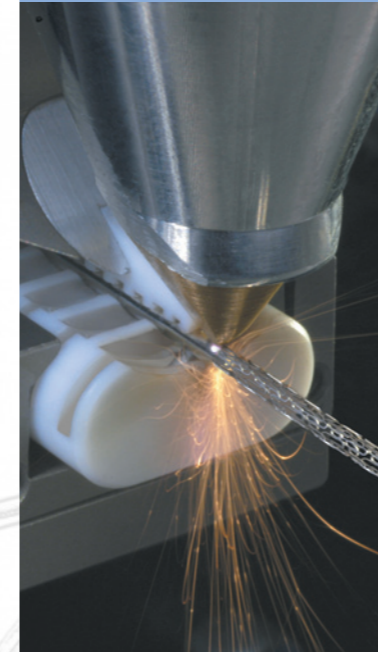


## Why ROFIN

Minimally invasive surgery, miniaturized implants – most of the next generation of products used in medical devices are getting smaller and smaller. Creating finest cuts and welds and using extremely material-sensitive processing, laser technology is the ideal method to meet these requirements. For almost three decades ROFIN has been developing laser systems, complete system solutions for medical device technology combining all essential technologies: from laser sources to individual system solutions – from a single supplier.

ROFIN pools all advantages of a leading global laser manufacturer with laser application competence. This means 30 years of experience - not only in building lasers but also in application development, system solutions and process technology.

Three company divisions Macro, Micro and Marking produce lasers and laser systems for almost all industries with a power range of 3 to 20,000 Watt. More than 31,000 lasers installed all over the world and more than 1,600 employees at production, sales and service sites worldwide have made ROFIN one of the major laser manufacturers.



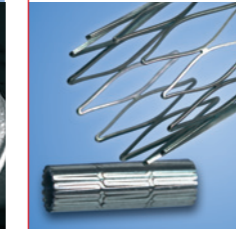
Cutting of stents

Finest cuts with cutting widths under 20 microns

Surface engraving of a stent e.g. for better drug coating



Even temperature-sensitive shape memory alloys like Nitinol can be processed by laser



Precise cutting of flat sheets with laser marking for product retraceability



Finest cuts under 20 microns – the granite base guarantees the required precision



## Cutting

Rod and fiber laser technology cut almost all kinds of metals and alloys commonly used in medical device technology. The minimal heat-affected zone prevents damage to temperature-sensitive materials, e. g. shape memory alloys like Nitinol. The flexibility in cutting geometries is almost unlimited, including edges with variable cutting angles. Through a CAD system any new outline can be defined and cut in a matter of minutes.

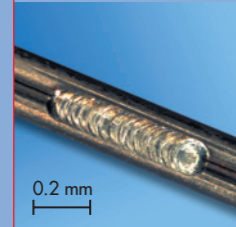
### StarCut Tube – best performance in stent cutting

The StarCut Tube is a high precision laser system designed for cutting medical implants like stents and other precision tubes. Equipped with up to 4 axes, the system allows the creation of most cutting geometries and can even process flat sheets. The StarCut Tube system concept allows integration of various laser sources. The StarCut Tube is also suitable to combine cutting, engraving and perforating of stent surfaces in one process step, e.g. for better drug coating.

### StarCut Tube – advantages

- max. 4 CNC controlled axes
- integration of various laser sources
- cutting speed up to 20 mm/s
- on-the-fly cutting applications with max. 20 revolutions per second
- cutting widths smaller than <<20 microns
- burr-free edges
- dry and wet cutting
- non-radial cuts
- compact and warp-resistant system design
- engraving and cutting in a single processing step
- power output dependent on speed

Finest wires can easily be welded



High-strength weld seams with pore-free surface quality



The Performance is a turnkey manual welding system for prototype and small batch production



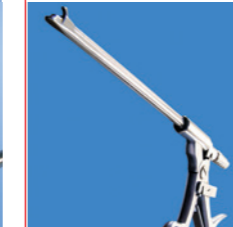
The Select is an ergonomically optimized welding laser for manual, joystick or CNC operation



Finest welds on pacemaker leads



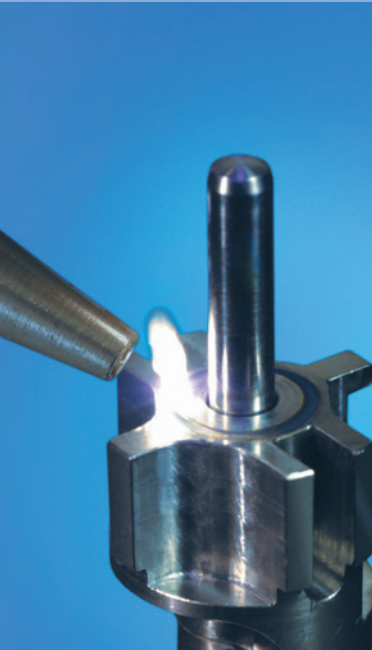
Reliable welds on instruments



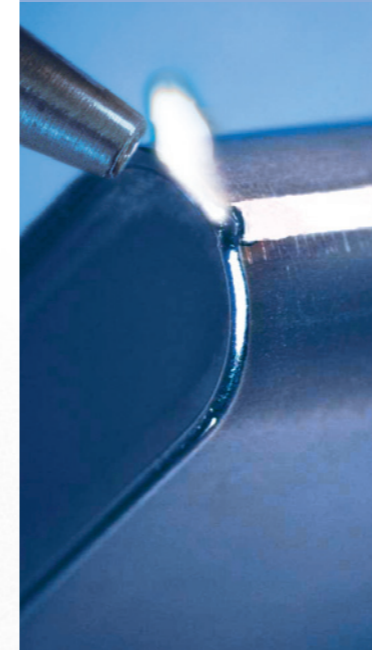
The Cube allows manual to semi-automated production



The Open Bench is a very flexible open system particularly suited for welding very long components



Welding with CNC



Helium tight seam weld

## Welding

Lasers create high-strength and helium leak-tight welds in metals and polymers with pore-free surfaces and in this way make this joining technique the ideal solution. Excellent beam quality, high pulse-to-pulse stability and flexible pulse shaping are the preconditions for finest seam and spot welds. Laser-welded joints can be used for high-temperature sterilization and exhibit pore-free surfaces even without finishing. This is a crucial requirement for biocompatible components.

### Performance – the original in manual laser welding

Launched by ROFIN Baasel Lasertech in 1992, you will find many thousand Performance systems operating all over the world today. Easy operation, relaxed ergonomic seating and arm position, a generously dimensioned working space and clearly legible display provide for a relaxed working situation. The laser is mobile, air-cooled and runs from a 230 V supply. There are numerous options allowing customization for specific applications.

#### Performance – advantages

- sweet spot resonator® integrated for first pulse suppression
- Micro Weld Option™ (< 100 microns)
- integrated exhaust unit
- integrated water/air cooling

### Select – manual, joystick and CNC welding

Ergonomically optimized manual welding laser, joystick-controlled deposit welder and precise 4-axis CNC system – all in one with an innovative design concept. A multi-functional joystick and a large color touch-screen are the ideal solution for an easy and intuitive operation. The system provides numerous functions for process validation and quality management in medical device manufacturing.

#### Select – advantages

- first pulse suppression
- Micro Weld Option™ (< 100 microns)
- xyz-axis system with joystick
- large working chamber
- rotary axis optional
- easy CNC programming
- integrated water/air cooling for 24/7 operation

### Cube – the all-purpose laser workstation

The efficient solution for manual or semi-automated production. The universal housing concept may be equipped with a wide range of ROFIN laser sources. The wide open front door makes installation and set up easy. The integrated laser control RCU drives the galvo head or the motor-driven axes if implemented. A touch screen ensures simple operation.

#### Cube – advantages

- desk top workstation with laser class 1 housing
- optional laser sources: StarPulse, StarFiber
- optional optics: galvo head, fixed optics
- touch screen for central control of laser source and process
- motor-driven z-axis for laser optics positioning
- sliding doors for fast workpiece loading
- linear axes, xy table, rotary axis optional

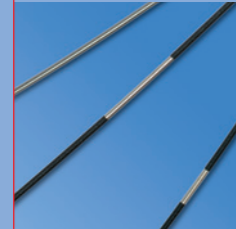
### Open Bench – flexible welding solution for the medical device industry

The Open Bench is an open laser workstation and is therefore particularly suited for welding long components like medical instruments or endoscopes. The system is equipped with a motor-driven rotary axis and z-axis, and tilt-adjustable optics which allow workpieces with large diameters to be processed from almost any angle. The operating unit of the Open Bench can be removed and placed in any position.

#### Open Bench – advantages

- laser intensity up to 150 W
- touch screen for central control of laser source and process
- open and variable system
- fiber-coupled laser source
- the welding head can be positioned via universal ball-joint
- Leica microscope
- camera viewing optional

Precise and selective material ablation in guide wires for setting tangible marks for cardiologists



Easy Opening – selective weakening of individual layers in packaging



CO<sub>2</sub> lasers for ablation and structuring of metals, ceramics and polymers



Laser structuring \*

Laser structuring of bracket rear sides for optimal adhesiveness

\*By courtesy of one of the leading dental companies Dentaurum, who is holding the patent for laser structured bracket bases.

## Structuring

Each application is in principle a material ablation produced by short and high-energy laser pulses. The precise process control allows micro structures smaller than 15 microns and ablating complete surfaces layer by layer. In this way, small areas in polymer layers on catheters can be removed selectively. Tailor-made surface structures can also be realized in order to optimize bonding characteristics of implants. Q-switched solid-state lasers allow the production of filigree micro mold dies designed with extremely narrow channels.

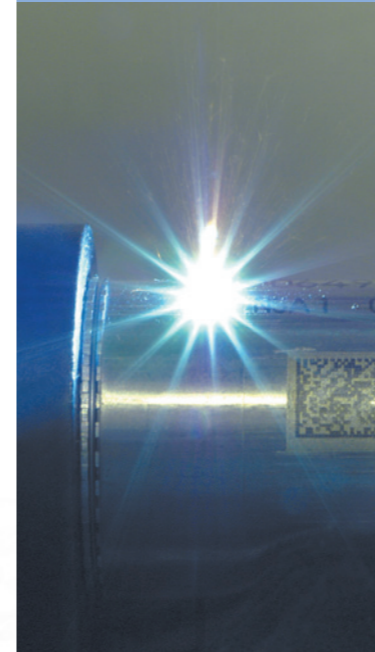
The predominant technique for easy and precise opening of packaging is called Easy Opening. This means selective weakening of packaging films with the laser. Laser technology uses the different optical characteristics of the individual film layers and selectively weakens the supporting layer without damaging light-tight, humidity-proof and hermetic layers.

### StarShape – CO<sub>2</sub> laser for all purposes

The StarShape series offers five different wavelengths and a power range from 100 to 2500 Watt – the precondition for perfectly positioned and material-selective structuring solutions. Due to very long focal lengths, the excellent beam quality allows relatively small spot sizes despite large-scale processing areas. The high energy density is a precondition for extraordinarily precise and fast processing.

#### StarShape - advantages

- various wavelengths ranging from 9.15 microns to 10.6 microns
- low-maintenance slab technology
- material selective processing
- 2 and 3-axis galvo heads
- automatic field size adjustment
- multi kw laser power with galvo head
- dedicated software
- application lab for process validation



Annealing marking

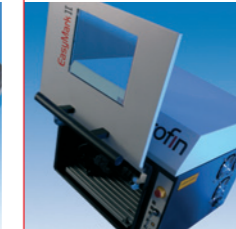
Laser marked pacemaker



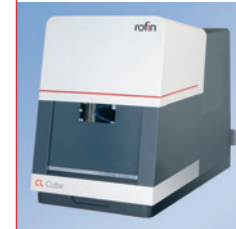
Biocompatible, abrasion-proof marking



EasyMark II is a user-friendly tabletop unit for easy laser marking



The CombiLine Cube is designed for manual to semi-automated laser marking



## Marking

Lasers apply consistent marking to metals and polymers without any filler material. Marking by modifying the material color, annealing on metal, carbonization or foaming in polymers – provide corrosion-free marking without creating burrs or debris. There are almost no technical limits to the marking outline and content. Individualization is easy due to the flexible computer control of the complete process, and on-the-fly marking can be carried out even on fast-moving workpieces.

### EasyMark II – the compact all-round system

The Easy Mark II marks metal surfaces and polymers, either flat parts or curved surfaces can be marked with high quality. The Visual Laser Marker Software allows the marking pattern to be designed and transferred using a standard PC environment. Help functions allow easy set up of focussing and positioning and can easily be learned.

#### EasyMark II – advantages

- desk top system
- integrated air cooling
- single phase 230 V power supply
- ideal for metal and polymer components
- Visual Laser Marker Software
- computer-controlled z-axis and rotary axis as an option

### CombiLine Cube marking workstation – flexible integration

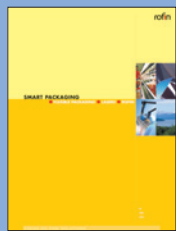
The efficient solution for manual or automated laser marking. The easy access provided by the front hood makes adjusting and set-up easy. The compact all-in-one desk top housing can easily be integrated into any production environment. The comprehensive portfolio of ROFIN laser sources ranges from fiber lasers showing excellent ablation rates for engraving to end-pumped solid-state lasers.

#### CombiLine Cube – advantages

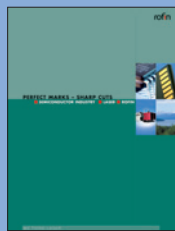
- desk top system with laser class 1 housing
- integration of various laser sources possible
- semi or fully-automated lifting doors for rapid loading
- workpiece side loading possible
- integration of 19" components in the support frame (optional)
- small footprint



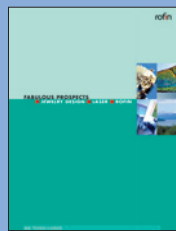
Medical Device  
Technology



Flexible Packaging



Semiconductor



Jewelry



Solar Power

### LASER MICRO

#### Carl Baasel Lasertechnik GmbH & Co. KG

Petersbrunner Str. 1b  
82319 Starnberg  
Phone +49(0)8151-776-0  
Fax: +49(0)8151-776-4159  
Email: sales@baasel.de

### LASER MACRO

#### ROFIN-SINAR Laser GmbH

Berzeliusstraße 87  
22113 Hamburg  
Phone: +49(0)40-733 63-0  
Fax: +49(0)40-733 63-4100  
Email: info@rofin-ham.de

### LASER MARKING

#### ROFIN-SINAR Laser GmbH

Dieselstraße 15  
85232 Bergkirchen/Günding  
Phone: +49(0)8131-704-0  
Fax: +49(0)8131-704-4100  
Email: info@rofin-muc.de

## SOLUTIONS FROM A SINGLE SOURCE

■ [WWW.ROFIN.COM/medical](http://WWW.ROFIN.COM/medical)

**A:** Phone: +49-(0)8151-776-0  
E-mail: sales@baasel.de

**Benelux:** Phone: +31-(0)78-69310-37  
E-mail: info@rofin-baasel.nl

**CDN:** Phone: +1-905-607-0400  
E-mail: info-canada@rofin-inc.com

**CH:** Phone: +41-(0)32-3221010  
E-mail: info@rofin-baasel.ch

**DK:** Phone: +45-631-717-97  
E-mail: avnmaskin@avnmaskin.dk

**E:** Phone: +34-948-324-600  
E-mail: info@rofin-es.com

**F:** Phone: +33-(0)-1-6911-3636  
E-mail: info@rofin.fr

**FIN:** Phone: +358-(0)20-769-9900  
E-mail: info@corelase.fi

**GB:** Phone: +44-(0)-1327-701-100  
E-mail: info@rofin-baasel.co.uk

**I:** Phone: +39-039-2729-1  
E-mail: info@rofin.it

**J:** Phone: +81-(0)46-229-8655  
E-mail: info@rofin-baasel.co.jp

**PRC:** Phone: +86-(0)21-68552216  
E-mail: info@rofin-baasel.com.cn

**RC:** Phone: +886-(0)2-2790-1300  
E-mail: info@rofin-baasel.com.tw

**ROK:** Phone: +82-(0)2837-1750  
E-mail: info@rofin-baasel.co.kr

**SGP:** Phone: +65-6482-1091  
E-mail: reception@rofin-baasel.com.sg

**USA:** Phone: +1-734-455-5400  
E-mail: info@rofin-inc.com