C-MAC® –

The new generation of KARL STORZ Video Laryngoscopes: BOEDEKER-DÖRGES Video Laryngoscopes

New!
D-BLADE

New!
C-CAM™

STORZ
KARL STORZ—ENDOSKOPE
THE DIAMOND STANDARD

10 Years Anniversary
MACINTOSH Video Laryngoscope

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When KARL STORZ, one of the first companies to manufacture video laryngoscopes, decides to continue its highly successful DCI® video intubation product family with the 4th generation of video laryngoscopes, customers can rest assured that this will involve more than just superficial updates to the existing chip technology. The most distinguishing feature of the latest generation of C-MAC® video laryngoscopes, developed in collaboration with Prof. Berci, is the consistent implementation of a variety of factors, which have come to be viewed as key customer requirements:

- The fastest possible access to the system in emergencies
- A video image of outstanding quality in the homogenously illuminated oropharynx
- No fogging of the laryngoscope
- Optimized battery power with extremely low weight and small dimensions
- Realtime recording of video sequences and still images is fast and simple
- Easy and fast reprocessing according to the latest standards
- The familiar system integration used with KARL STORZ instruments is retained for the new system.

The operation, however, has been consistently simplified, resulting in a video laryngoscopy system, which has been reduced to what is most necessary and sensible for daily rountine, teaching, training and Difficult Airway Management. Therefore it offers the user maximum safety.

* Prof. Dr. George BERCI, Los Angeles

Initially, The C-MAC® video laryngoscope is available in the original MACINTOSH blade shapes (sizes 2, 3 and 4), the MILLER shape (sizes 0 and 1), and in the blade shape for difficult airways – the D-BLADE™. The design used for the MACINTOSH laryngoscopes is based on the original English blade shape from the early 1960s. The MILLER laryngoscopes correspond with the current MILLER form. The design is in line with the European closed form, which ideally satisfies the stringent demands placed on hygiene and ergonomics. The shape has been optimally rounded, as corners and edges may have an unfavorable or, indeed, traumatic effect during use and preparation.

In manufacturing the blade from stainless steel, it has been possible to reduce the length of the blade to a minimum. At the same time, the proximal finish has a pronounced flat form which enables endotracheal intubation even with a reduced oral aperture. Damage to the incisors can also be reduced.

The image on the distal lens is acquired using a CMOS chip, which guarantees a field of view of approx 80° (diagonal) and thereby an optimal insight into the pharynx and larynx. An energy-saving and diffuse LED with a high light output ensures balanced illumination of the entire application area. The special design of the electronics prevents fogging of the lens.

EMI Test Report (EASA.21J.266)

This test comprises electromagnetic compatibility checks. On the one hand, it is tested whether electromagnetic emissions from the C-MAC® could damage the electronics on board a helicopter and, on the other hand, whether the electronics on board a helicopter could impair the functioning of the C-MAC®. The C-MAC® system passed this test, which was conducted by the German Air Rescue Service for the helicopter types EC135, EC145 and BK-117, on January 30th, 2009.

dBLADE

The Ultimate Solution in Difficult Airway Management

The new component for the C-MAC® system – the D-BLADE™ – was developed in cooperation with Prof. Dr. Volker Dörges from the University of Kiel.

The main distinguishing feature of the D-BLADE™ is its shape, which is considerably different than that of conventional laryngoscope blades. Characteristic of the D-BLADE™ is an elliptically tapered blade shape rising to distal. This shape – the result of over 60 years' experience in the field of Ear-Nose-Throat and many years' experience in airway management and in the development of imaging methods – provides an ultimate solution.

Based on the DÖRGES blade, which took the first steps toward achieving a universal blade shape as early as around 10 years ago, the lateral shape was essentially retained. The lateral guide on the D-BLADE™ for large suction catheters underscores its application in emergency medical care and trauma management.

The D-BLADE™ will close the gap between MACINTOSH laryngoscopes and flexible fiberscopes. Particularly when it comes to anatomically difficult patients (C&L III and IV), the D-BLADE™ offers a quick and easy solution. The option of exchanging all components within seconds also makes it possible to swap directly to the D-BLADE™ after preliminary assessment using, for example, a MACINTOSH laryngoscope. In this way, and when used correctly, swellings, hemorrhaging, and other 'side-effects' can be avoided.

The closed design of the laryngoscope allows the D-BLADE™, like all other components, to be prepared quickly and without problems. It is qualified and validated for the following low-temperature reprocessing methods up to a maximum of 60°C: manual/automated cleaning an disinfection (HLD), sterilization with Steris® AMSCO-V-PRO1, Sterrad® (50S, 100S, 200, NX, 100NX) and EtO gas. Further details about the specific validated processes and detergents can be found in the IFU.

A Clever Guide Rail for a Variety of Solutions

- Heavy bleeding and the build up of secretions in the laryngeal and pharyngeal region can considerably compromise visualization of the vocal cords or even render this impossible. It is not always possible to solve this problem simply by means of optimal positioning of the suction catheter and assistance from additional personnel.
- In the case of extremely difficult laryngeal positions, within the algorithm it may be advantageous to initially position a catheter (e.g. an AINTREE catheter) in the trachea and to use this to push the endotracheal tube forward under visual control.
- In various cases, the use of an O_2 catheter and administration of O_2 throughout the entire intubation process may prove extremely beneficial.

These three processes can be simply solved with the guide rail on the C-MAC® laryngoscope. This clever idea has been developed by Prof. Dr. Ben Boedeker* and Prof. Dr. Volker Dörges**.

On the blind side of the C-MAC® laryngoscope there is a half-open guide rail which enables controlled insertion of the catheter with the laryngoscope already inserted. The half-open design allows the catheter to be easily removed. The entire procedure can be performed by a single person.

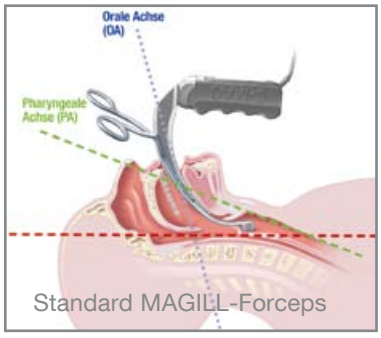
This guide rail is available for the MACINTOSH laryngoscopes sizes 3 and 4 as well as for the D-BLADE™.

The BOEDEKER Forceps – a Little Idea with a big Impact

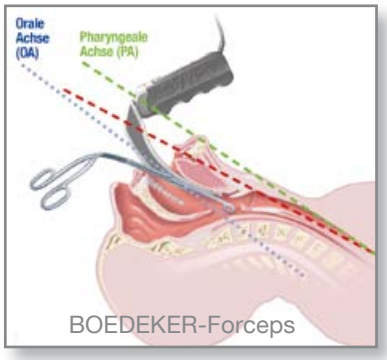
- Foreign bodies in the laryngeal and pharyngeal region through to just behind the vocal cords is a common diagnosis in emergency medicine.
- Nasal intubation is essential for certain interventions.

Both can be simply solved with the MAGILL forceps, which have been modified in accordance with BOEDEKER. The shape of the MAGILL forceps has been adapted to the blade shape of a MACINTOSH laryngoscope, whereby the tip of the forceps projects into the camera's view. Whilst with a normal laryngoscope both procedures could only be managed with great difficulty and on a half-blind basis, in combination with the C-MAC® system optimal vision and handling is guaranteed.

In particular, guidance and positioning of the nasally inserted tube during video laryngoscopy is made simple by the BOEDEKER forceps.



Standard MAGILL-Forceps



BOEDEKER-Forceps

The Electronic Module

The electronic module is the interface between the front-end 'video laryngoscope' and the monitor unit. It can be inserted into the laryngoscope's receptacle quite simply and removed just as easily after the operation and positioned for repreparation.

The electronic module can be used to record both still images and video sequences directly from the video laryngoscope onto the integrated SD memory card in the monitor. This is achieved simply by pressing the corresponding key.

Monitor

Recommended Settings

	Brightness	Contrast	Saturation	Hue
8402 ZX	30 %	25 %	40 %	100 %

The high-resolution 7" TFT monitor is accommodated in a housing made of a resistant plastic, which can also withstand heavy loads. The brightness of the monitor can be adapted to light or dark surroundings at the touch of a button. If necessary, it is also possible to perform a manual white balance. Control menus have been deliberately avoided in the whole system operation, as the easy-to-use touch keys guarantee instant operation even under difficult circumstances.

The electronic module's cable connections and power plug are protected by being attached at the rear of the device and have coded plug connections. The compact, ergonomically designed monitor can be operated in a protective bag, without the need to be removed. The standardized VESA 75 receptacle allows the necessary holders and fasteners (racks, clamps etc.) to be attached easily.

Rechargeable lithium-ion batteries provide for operation lasting for approx. 2 hours. Intelligent energy management allows use of the system even during the charging process. The video sequences and still images are saved on an integrated SD card in MPEG4 or JPEG format. The SD memory card is easy to remove and simplifies data transfer and further processing.

Advantages and Special Features:

Recorded **stills and videos** can now **directly be displayed** on the monitor 8402 ZX. Also, the image quality was greatly improved using **new software**.

Optimized natural color rendering and improved image quality make an improved exposure of anatomical structures possible.

Image display on an external monitor is possible via the **composite video output**. This facilitates, amongst others, difficult airway management, teamwork, training and education and opens up the possibility of Telemedicine.

C-MAC® becomes a system. With its compatibility to additional units like the well-established CMOS-Nasopharyngoscope and forthcoming flexible intubation fiberscopes and the BONFILS/BRAMBRINK intubation endoscope, C-MAC® creates an optimal portable platform.

C-CAM™

Transform your Video Laryngoscope into a System!
Airway Management Demands more than just a Single Instrument!

The C-CAM™ is the ideal addition to airway management. Why? Because, despite its compact size and weight of just 117.9 g, it features a high-quality camera which boasts genuine VGA resolution on the C-MAC® monitor.

What's more, you don't have to give up what you know and trust. The quick and familiar changeover of telescopes is possible within seconds, even in hectic situations, thanks to the tried and tested KARL STORZ grasping mechanism.
Similarly, you don't have to make do without a telescope. The C-CAM™ features a standard eyepiece mount and, as such, enables, amongst other things, the connection of all KARL STORZ airway management tools such as intubation fiberscopes, BONFILS and video laryngoscopes to the C-MAC® monitor.

Thanks to its compact size, low weight and simple handling, the C-CAM™ is virtually predestined for mobile use with the C-MAC® as it fits in all ambulances and rescue helicopters. Since it is so easy to use, the error rate is minimized which, in turn, results in enhanced safety for patients as well as physicians.

The advantages of C-CAM™ at a glance:

- Genuine VGA resolution of 640 × 480 pixels
- Rapid changeover with all KARL STORZ eyepiece instruments
- Real time video and image documentation of all interventions, including intubation and bronchoscopy etc.
- Suitable and validated for the following low-temperature preparation methods up to max. 60°C: Manual/machine cleaning and disinfection, sterilization with Steris® AMSCO V-PRO 1, Sterrad® (50S, 100S, 200, NX, 100NX) and EO gas. Detailed information on the validated methods and approved chemicals can be found in the in-depth instruction manual.

3Ts* – Essential for Secure Video Larygoscopy

TIP:
Visualized blade tip for improved orientation

TARGET:
Improved viewing of the target structure

TUBE:
Insertion of the tube is possible without guiding stylet

* Preconditions for secure video larnygoscopy are that the *Tip*, *Target* and *Tube* can be identified on the monitor

SD Card vs. USB Port

An SD card was selected intentionally because:

- a USB port is an open port, which would make the unit no longer splash-proof
- a USB port is medically unsafe, as it is not safely coded
- breaking off the insulation lip constitutes a total loss and results in a short circuit
- a USB port is subject to the requisite software 2.0 or 3.0. This cannot guarantee that the memory stick will also function at the same speed
- there is a risk of the memory stick being snapped off easily while inserted in the USB port, which also generally constitutes a total loss of the monitor
- an SD card with 2 GB is a closed, safe system, which is also protected against splashes when in operation. It may be more expensive than a USB port, but offers considerable advantages, especially in the medical field

C-MAC®: Special Features

- Compact design
- Instant operation
- Closed laryngoscope blade
- Ergonomically designed handle
- CMOS technology
- Video output: Composite NTSC signal
- 7" TFT Wide-View-Angle Display with 800 × 480 pixels resolution
- Resistant ABS plastic housing
- Splash-proof according to IP54
- LED illumination
- Video and still image documentation in real time on ULTRA II and HD-SD memory card
- Sturdy, coded safety plugs on the monitor's rear side
- Operation with line voltage and rechargeable Li-ion batteries
- VESA 75 norm for connection and attaching racks
- Qualified and validated for the following low-temperature reprocessing methods up to a maximum of 60°C: manual/automated cleaning and disinfection (HLD), sterilization with Steris® AMSCO-V-PRO1, Sterrad® (50S, 100S, 200, NX, 100NX) and EtO gas.
- System for Airway Management visualization with C-CAM™

Sturdy connectors

Easy-to-use clamping mechanism to attach to stands

Device for insertion of a suction or O_2 catheter

Monitor attached to stand

Accessories

C-MAC® Protecting Bag

Clever storage for instant operation

- Consisting of 2 separate compartments for two C-MAC® Video laryngoscopes with electronic module and monitor
- During operation, the monitor may remain in the protective bag
- Non-reflecting window for easy reading of the monitor display

The C-MAC® Protective Bag is available in different colors

C-MAC® Protective Bag, open

C-MAC® with non-reflecting window

Instruments

8401 AX

8401 BX

8401 KXC

8401 HX

20 2901 32

8402 ZX

8402 X

8401 AX	BOEDEKER-DÖRGES **C-MAC® Video Laryngoscope**, CMOS technology with MACINTOSH laryngoscope blade **size 3**, with device for introduction of an O_2 or suction catheter up to size Fr. 14 – 16
8401 BX	BOEDEKER-DÖRGES **C-MAC® Video Laryngoscope**, CMOS technology with MACINTOSH laryngoscope blade **size 4**, with device for introduction of an O_2 or suction catheter for size Fr. 16 – 18
8401 KXC	BERCI-KAPLAN **C-MAC® Video Laryngoscope**, CMOS technology with MACINTOSH laryngoscope blade **size 2**, angle of view apprx. 80°
8401 HX	DÖRGES **C-MAC® Video Laryngoscope** with special blade shape for the difficult intubation, CMOS technology, with device for the introduction of suction catheters for size Fr. 16 – 18, angle of view approx. 80°
20 2901 32	**C-CAM™, 1-Chip CMOS Camera Head**, resolution 640 × 480, focal length f = 20 mm, compatible with 8402 ZX
8402 ZX	**Monitor,** for CMOS-Endoscopes, screen size 7", memory option with SD card, rechargeable battery, power adaptor for EU, UK, USA and Australia, power supply 110 – 240 VAC, 50/60 Hz, suitable for wipe disinfection
8402 X	**Electronic Module** for C-MAC® monitor 8402 ZX, suitable for manual and mechanical disinfection up to 60°C; Steris®; Sterrad®; High Level Disinfection (HLD) acc. to US standards. Use with: C-MAC® video laryngoscope

Accessories

8401 YA

8401 YAA
8401 YAB

8401 YB

8401 YA	**IV-Stand,** for C-MAC® monitor, height 120 cm, rollable with five legs and antistatic castors, crossbar 25 cm x diameter 25 mm, for positioning the monitor, with tray for laryngoscopes, dimensions (w x d x h): 30 x 20 x 10 cm
8401 YAA	**Crossbar,** for Stands 8401 YA, 50 cm x diameter 25 mm, for positioning C-MAC® Monitor 8401 ZX
8401 YAB	**Same,** 70 cm x Ø 25 mm
8401 YB	**Clamp,** VESA 75 Standard, for fixation of C-MAC® Monitor 8401 ZX, diameter 25 cm

Accessories

8402 YD

39501 LC2

809125

8401 YZ

8402 YD	**Protective Bag,** for C-MAC® system, made of water-resistant, washable, separate compartments for the monitor and two C-MAC® video laryngoscopes with electronic module, color: red
8402 YD-1	**Same**, color: red
8402 YD-2	**Same**, color: orange
8402 YD-3	**Same**, color: NATO olive
809125	**MAGILL Forceps,** modified by BOEDEKER, length 25 cm, suitable for endoscopic foreign body removal, for use with video laryngoscope sizes 3 and 4
39501 LC2	**Tray** for Cleaning, Sterilization and Storage, for two C-MAC® video laryngoscope blades incl. electronic module, with holder for fixing and sealing electrical connections, external dimensions (w x d x h): 260 x 120 x 170 mm
8401 YZ	**Protection Cap,** for the C-MAC® video laryngoscope, to protect plug contact during reprocessing

Note: The pictured instruments are not included in the tray's scope of supply

Notizen

Saving Combat Casualties Lives

Advantages of Telemedicine & Endoscopy in Military Operations to Save Lives, Time & Money

Pre-deployment medical training & treating a combat casualty do not have a standardized approach within NATO. From when the combat casualty is wounded to being received along the chain of medical help from an operational environment to home-bound domestic care, there are many treatments administered with the casualty also changing in situation and condition.

Through Telemedicine and Endoscopy in Military Operations, we now have the solution to provide up-to-date communication and preparation of treating a wounded casualty that will ultimately help to save lives, time and money.

- Improving communication and Telemedicine between every clinical team who will treat the same injured combat casualty.
- Enabling the best surgical success for a high quality post-operative recovery of the combat casualty.
- Increase the efficiency and preparation methods of the clinical team who will treat the combat casualty.
- Providing real time audio and visual from first treatment of the combat casualty, to the receiving medical treatment team.
- Secure medical communication for all key medical treatment and training facilities within NATO.

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