Disinfection Box
EKB 100

Instruction Manual

Manual

UVpro EKB 100

UVC Disinfection Box

Dear customer
We thank you for choosing a product from **orca** GmbH.
The following instruction manual is intended for your safety in dealing with our product. Before assembling and using this product, please read through the instruction manual carefully in order to avoid dangerous or harmful situations.
Save this document and make all users of the product aware of it!

INHALTSVERZEICHNIS

1. SAFETY INSTRUCTIONS

1.1. Dangers

Incorrect connection or incorrect operation may result in the following dangers:

- Electric shock
- Blinding of the eyes
- Burning of skin
- Damaging the sterilization device
- Damaging other devices, materials, or disturbing the production process
- Decrease or absence of sterilization performance

Users, installers, maintenance, and cleaning personnel must be made aware of possible dangers and follow the instruction manual's instructions.

1.2. Safety symbols

DANGER

DANGER ELECTRICAL VOLTAGE

DAMAGE VIA UVC RAYS

INFORMATION

1.3. **Before using the product**

Read the instruction manual

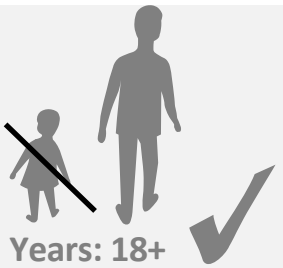
All persons using the gage in terms of measurement, service, use, and reparations must confirm that they have read and understood the instruction manual.

Please ensure that a copy of the instruction manual is at all times available to the relevant personnel

The operator is responsible for any damages caused to third persons in the operating range of the model. Damages occurring due to misuse or false operation is the responsibility of the user.

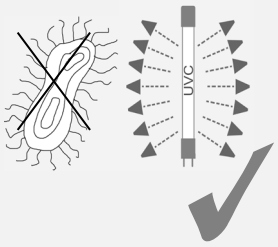
Minimum age: 18 years old

Only people 18 years of age or older may use the UVC log.



UVC sterilization system

The ***UVpro*** unit is a UVC sterilization system. Any other usage is improper.



No alterations

Only orca GmbH may alter the product. Alterations or changes made by anyone else are forbidden.

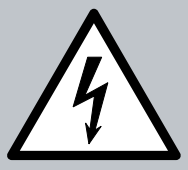
Only original replacement parts are under warranty

When replacing parts, only original parts may be used.
Failure to do so will void any warranty.

1.4. **Avoiding danger**

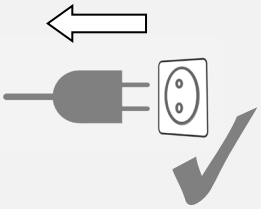
Maintenance by authorized personnel only

Maintenance work can only be done by authorized personnel.



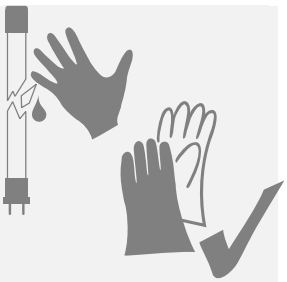
Maintenance only without power

Before any maintenance work can be done, ensure that no power is running through the equipment (turn off main switch or pull the electric plug out of the socket.)



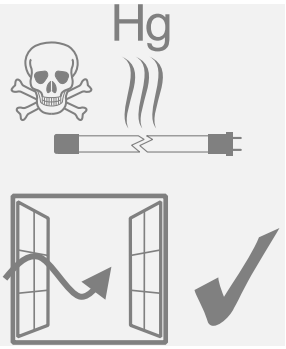
Broken glass danger

The UVC tubes are made from quartz glass, and can shatter or break. If using the UVC tubes, please wear gloves.



Guidelines if glass breaks

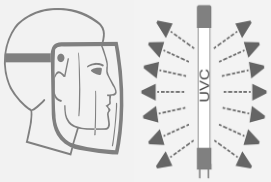
There is a possibility of liquid mercury leaking out from broken or damaged tubes. If this happens, please air out the room and dispose of shards, fragments, and tubes in appropriate waste systems.



The UVC-LOG itself does not pose any risk

While using the gage, there is a risk of being exposed to UVC rays!

UVC light can be measured in the wavelength 254 nm (not visible!). This UVC radiation damages the cornea: Eyes and skin must therefore be protected.



λ = 254 nm (UVC)

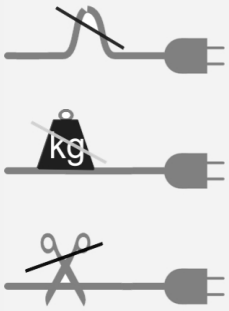
Never look into a luminous UVC source without protection!

When controlling tube function, personal protective wear, items that protect against UVC, must be worn. Gloves must be worn, and skin can be protected by using long sleeved clothing.

1.5. **Measurements on site**

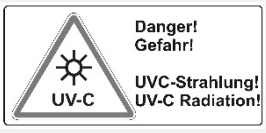
Cables carrying electricity should be undisturbed

The cables carrying electricity must be laid in a way that they are not bent, cut, underneath heavy objects, or in any other way at risk of destruction.



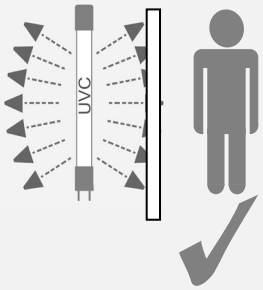
Warnings

The appropriate warnings (for example “Attention, UVC radiation: Protect eyes and skin”) Must be set up in a place where they are easy to spot before one enters the dangerous area.



Protection against UVC radiation

Install protection against UVC radiation!
Optical glass, acrylic glass, or opaque items, like sheets are impermeable to UVC radiation and will protect against it.



1.6. **In case of emergency**

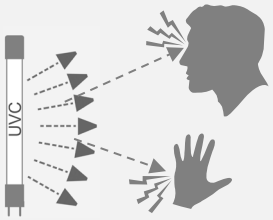
What to do in case of damage to eyes or skin

UVC rays lead directly to painful information of the cornea and redness of skin.

It is possible that the effects only appear after a few hours have passed.

In cases of emergency, see a doctor!

The same applies to skin burns.



2. TECHNICAL DATA AND DESCRIPTION OF THE SYSTEM

2.1. Overview

Type	**UV*pro* EKB 100**
In conformity with requirements	EMV, CE, IP52
Material	Sheet steel powder-coated, stainless steel: WN 1.4301 & WN 1.4305
Operating temperature [°C]	0...+40
Suitable **UV*pro*** tube	4x HNSL 24W
Input power [W]	100 (4 x 25)
Current flow [mA]	450
Total UVC output [$W_{253,7\ nm}$]	32 (4 x 8)
Intensity at 10 cm [$\mu W/cm^2$]	10.700
Internal size (W x H x D) [mm]	445 x 335 x 320
External size (W x H x D) [mm]	560 x 400 x 445
Weight [kg]	23
Tube replacement interval [h]	6,000 (75 % $^{\pm 5\ \%}$ output performance)
Life expectancy electronics	> 10 years
Supply voltage [V_{AC}]	220...240 (50...60 Hz)
Power cable length [m]	5
	Technical changes reserved.

2.2. **Product description**

The ***UVpro*** Disinfection Box is made out of powder-coated sheet steel. For an even irradiation with high efficiency, the interior is completely lined with special reflective VA sheet metal. 4 UVC beams (4 x 24 W), two on the floor and two on the ceiling of the unit, ensure maximum performance and short exposure times.

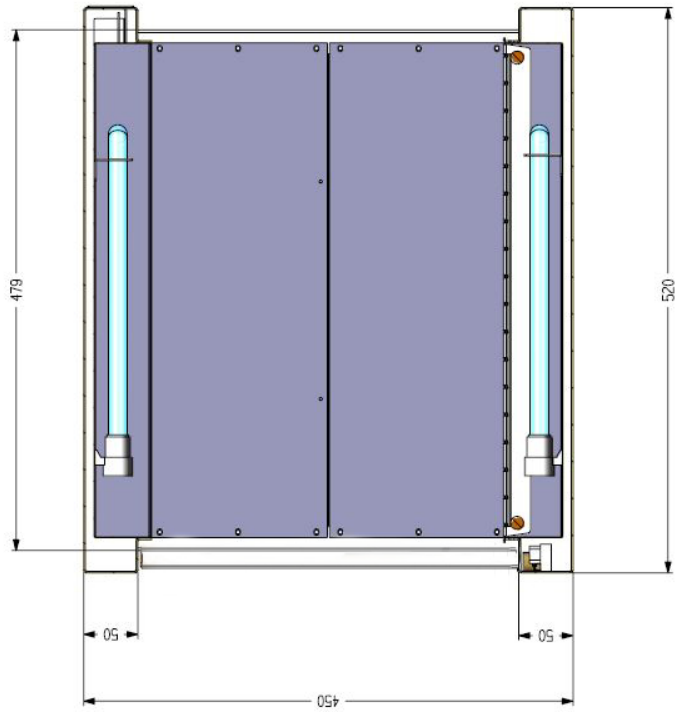
The emitter units include UVC tubes, fixed with stainless steel brackets, an electronic ballast that is mounted on the side wall of the box, an on-/off- switch and a safety cover switch. The power is supplied via power cable.
The disinfection box must be inserted into an outlet via 230 V cable. To put the unit into operation, the red switch on the front of the unit must be operated. The setting of the exposure time can be changed with the control dial that is also placed on the front side of the unit. To start the disinfection process (ignition of the tubes), the green button must be pushed.

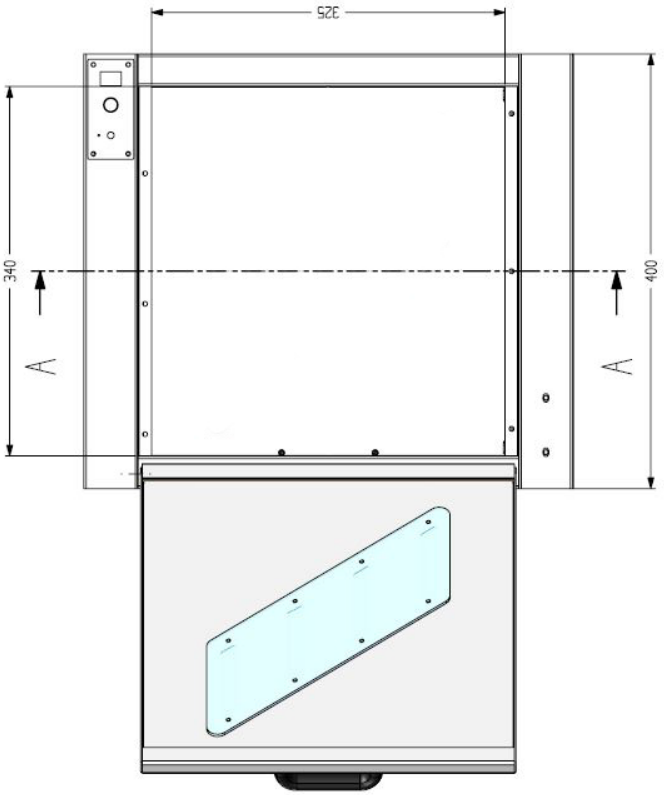


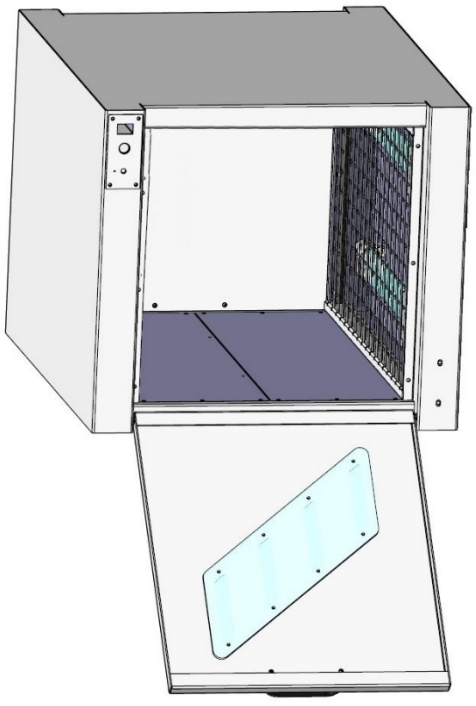
2.3. **Direct connection or with UV*pro* monitoring units**

- UV*pro* CU1	The optional, available control unit **CU1** serves as a ***UVPro*** monitoring device. More information can be found in the documentation belonging to this monitoring unit.
- UV*pro* UVC-Line 8/16/24	The optional, available control unit **UVC-Line 8/16/24** serves as a monitoring unit for more than one **UVpro** device. More information can be found in the documentation belonging to this to this monitoring unit.
- Network, direct	230 V_{AC} $^{\pm 10\,\%}$. Securing the connection via a **residual current circuit breaker** (30 mA) is mandatory!

2.4. **Dimensions and sketch**







3. INSTALLATION

3.1. Safety instructions

UVC rays lead directly to painful damage of the cornea and redness of skin.

Never look into a luminous UVC source without protection! This UVC radiation damages the cornea: Eyes and skin must therefore be protected. It is possible that the effects only appear after a few hours have passed.
In cases of emergency, see a doctor!

3.2. Installation Information

The **UV*pro*** EKB 100 was carefully tested before delivery and subjected to a functional check. The high-quality packaging is intended to prevent transport damage, but even with careful handling, damage cannot be completely avoided. Possible transport damage relates in particular to the UVC tubes made of quartz glass. Inspect the UVC tubes and the potted tube sockets before installation. Check that the cables are not damaged. Check the completeness of the delivery.

Check the completeness of the delivery. If there are parts missing or mounted incorrectly, the unit cannot be taken into operation.

The unit is delivered pre-finished. Only the electrical connection has to be established.

UV*pro* units should only be installed with an intact cable.

Check cable and connecting elements before installation.

3.3. Cleaning

After spillage of liquids or soiling the interior by other food residues (crumbs, fat etc.) it should be cleaned with a damp cloth. The grating-intermediate bottom can be removed for this purpose.

3.4. **Electrical connection**

The electrical connection of the tape disinfector has to be carried out according to the relevant regulations (EN 60 598-1) by authorized specialist personnel.

For system monitoring, we recommend the connection via a ***UVpro*** CU1 module or for the operation of several devices via the **UV*pro* UVC-Line 8/16/24** system. Otherwise a direct main connection via socket 230 V_{AC} $^{\pm 10\,\%}$ is fused with a 30 mA protective switch.

The device may only be connected by a specialist (electrician).

The circuit is to be protected with a residual current circuit breaker (30 mA)..

4. **TO BE AWARE OF WHILE IN USE**

After the device has been assembled and positioned, no further work is required. If the device gets dirty it must be properly and thoroughly cleaned. The most important thing is that the UVC pipes don't collect dirt, since this gravely affects its sterilizing abilities.

After 6,000 working hours, the tubes are working at ca. 75% of their original power. Replacing the tubes is now necessary. (See chapter 7.2 „Operating time of tubes").

5. **OPERATION OF THE UVC DISINFECTION BOX**

5.1. **General**

The ***UVpro*** EKB sterilization box is ideal for reliable sterilization of work equipment, tools or other objects which must be placed in sensitive areas. It minimizes the risk of contamination of lunch-boxes, beverage bottles, mobile phones, power drills and screwdrivers, etc. by viruses, bacteria, yeasts and mold spores. To avoid performance drop due to shades, place objects with an appropriate distance next to each other.
After closing the door, the red power switch should be operated.
The exposure time can be set with the rotary potentiometer. In case of doubt choose the highest value. The UV radiators will be switched on by pushing the green button.

5.2. **Time control**

The UVC disinfection box is to be switched on with the red rocker switch. With pushing the green start button, the UV radiation starts for the pre-set time that was set by operating the rotary potentiometer. The red flashing LED shows the course of time. Repeated pushing of the start button switches off the radiation directly. To start the radiation, it is required that the door of the unit is closed.

5.3. **Time setting**

The radiation time is adjustable between ca. 1 to 32 min. (4 areas)
Normally, a radiation time of 5 min. is sufficient.
The time between 1 to 8 min can be read at the potentiometer. (area 1)

5.4. **Pre-selection**

The time setting can be programmed on 4 areas in total:

Area 1	1- 8 min.
Area 2	2- 16 min.
Area 3	3- 24 min.
Area 4	4- 32 min.

To change the area proceed as described:

1. Set rotary potentiometer to the correct value of the area (1-4).
2. Press green switch for a long time (ca. 3 sec.) until the red LED flashes.
3. The number of flashes shows the chosen area (can be still changed by the potentiometer).
4. Press green button again shortly. The pre-selection will be memorized.

Area 1 is pre-set in the delivery state and the pre-selection of the potentiometer therefor is ca. 1-8 min.

6. ISSUES, CAUSE AND HOW TO FIX IT

In the event of a tube failure, the electronic ballast switches the tubes off (the ballast) automatically. This protects the board and the malfunction can be detected by our monitoring units. Using a replacement tube, you can check which of the tubes is defective. In the BD 2016 HD, there are mono and duo electronics for operating a tube. If two tubes are out of operation, the fault may be due to a single tube and the duo electronics system has switched both tubes off.

Issue	Cause	Fix
Immediately after the device is switched on, the residual current circuit breaker (residual current circuit breaker) trips.	The device has a closed circuit and is no longer ready for operation	It is possible water has entered the unit. The power supply must be interrupted and the device must be replaced and subjected to a one-man inspection at the manufacturer's premises.
The unit is turned on, but the tubes do not light up.	No power supply. Loss in gas pressure due to fine cracks in a tube or damage to the tiller at the radiator base.	Are all connections of the power supply applied? Examine the tubes and sockets for integrity and abnormalities.
The device is switched on and the tubes flash briefly, but do not ignite.	The electronic circuit tries to ignite the tubes, but the process is terminated because the gas pressure of a tube is too low. In case tubes are new, one tube has a production defect. With older tubes (> 12,000 operating hours), the gas composition changes, ignition can no longer occur.	If the system ignites with a replacement tube, the fault is in the tube. We will gladly exchange this tube for you. The tube life is exceeded, the tube must be exchanged
The **UVpro** tube no longer ignites and has silver coatings or blackening in the region of the helix. The service life is still below 12,000 h.	Frequently switching older tubes on and off faster than in continuous operation. At each ignition, particles are separated from the helix, which are deposited as an inner lining on the glass tube. As a rule of thumb, one hour of service life is calculated per ignition.	The tube life is exceeded, the tube must be exchanged.

Issue	Cause	Fix
There is condensation between the UVC tube and the jacket tube.	The outer casing may be damaged.	Check the glass for possible cracks.
	If no cracks are visible, the water must have penetrated through the screw connection.	Examine the area of the tube base for wetness. Dry the socket and replace the O-rings. After commissioning, the tube should be inspected promptly (daily).
The disinfection effect decreases and no longer corresponds to the interpretation.	After 12,000 operating hours, the UVpro tubes still provide about 75% of the initial power. The plant is configured for this value.	A tube replacement is recommended.
	If the tubes have not yet operated 12,000 hours, they are possibly soiled or calcified.	Clean the tubes according to our cleaning instructions.

7. MAINTENANCE

7.1. Safety instructions in case of service repairs

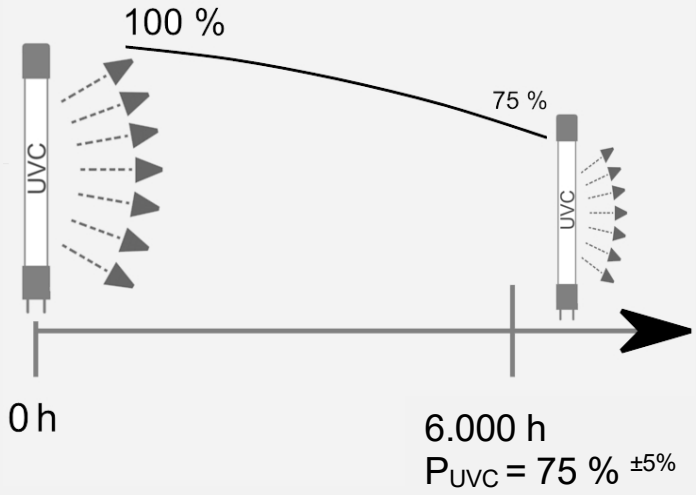
Remove the device from any power source before cleaning the tubes, or performing any repairs. The UVC tubes should also be disconnected from power during visual inspections.

Do not, under any circumstances, perform a visual control on the UVC tubes without wearing eye-protection! Protect your skin by wearing covering clothing, and never touch the UVC tubes without wearing gloves.

Before any repairs or work on the device, the device needs to be unplugged and disconnected from any power source. Touch the glass tubes only while wearing gloves.

Eyes and skin must be protected from UVC radiation. Please always wear protective goggles, gloves, and covering clothing while working in proximity to UVC tubes.

7.2. **Operating time of the tubes**



UVC tubes have a limited life. They are subject to a continuous aging process. The service life of the UVC tubes lies under normal operating conditions at 6,000 h (power drop 25 % ±5 % to the nominal UVC output of the respective UVC source).

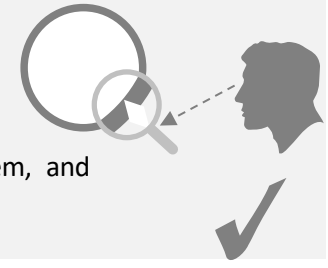
The effective radiation lies far outside the visible range and the UVC emission decreases continuously. It is therefore recommended to specify the operating conditions and the replacement date in a maintenance plan.

Continuous operation increases the life of the tube

The devices are designed for continuous operation and should not be switched on and off frequently.

Frequent switching (> 3 circuits / day) accelerates the aging process considerably

Inspect O-rings when changing tubes



When changing UVC tubes, check the seals, clean them, and replace them if they are damaged.

In order to avoid finger prints and thus grease on the tubes, we recommend wearing cloth gloves when working with the UVC tubes.

Always wear cloth gloves when changing UVC tubes.

The tightness of the UVC system depends to a large extent on the O-rings and their care. O-rings are frequently damaged during tube replacement. In addition, the tube-side rings suffer from very intense UVC radiation. Therefore, a careful check of the O-rings is recommended at every change. In sensitive areas, the O-rings on the tube side should be replaced as often as possible.

Replacing the O-rings is recommended every time the tubes are replaced. The O-rings should at least be subject to a detailed visual inspection.

7.3. **Maintenance of the components**

The quartz glass of the UVC tube has to be regularly checked and maintained. We recommend a soft, lint-free cleaning cloth. **Caution: The UVC tube is made of quartz glass and is fragile!** You should wear thin cloth gloves when cleaning it, in order to avoid injuries and also so as to not immediately contaminate the UVC tube with fingerprints. Due to soiling and calcification the performance decreases sharply. Regular inspections and fixed cleaning intervals are recommended. New installations should be checked more frequently (hourly) to get a feel for the intervals.
The UVC tubes can be freed from possible calcifications and other soiling by means of decalcifying and cleaning agents. For the metal parts, we recommend a standard stainless steel care product.

To avoid greasy deposits, never touch the UVC tubes with bare hands! Fingerprints form an almost impenetrable layer for ultraviolet radiation. Therefore, before using the system for the first time, cleaning the tube surface with an alcohol-containing agent is recommended.

7.4. **Original Accessories and replacement parts**

UV*pro* systems contain only high-quality components. This is the only way to ensure consistent high performance and quality. For a long service life and reliability, we ask you to read through all instructions closely before handling and operating these components. When procuring spare parts please make sure that they are original parts from **UV*pro*** or **orca** GmbH. We also recommend purchasing accessories from **UV*pro*** as well. Incorrect use of the equipment, or the use of unauthorized components can lead to health and property damage!

8. WARRANTY

For our general terms of delivery, please see our current warranties. Please feel free to contact us.

9. DISPOSING OF COMPONENTS

9.1. UV*pro* Tubes

UVC-tubes should be disposed of in special disposal, since they contain liquid mercury. In your community, there will be a station where it will be possible to dispose of the tubes for free.

9.2. Ballast with screw connection

The four-channel pipe with the ballast electronics can be recycled using the electrical equipment disposal.

10. APPENDIX

10.1. **EG Declaration of conformity**

EG-Declaration of conformity

We hereby declare,

orca GmbH, Hungenbach 1D, D-51515 Kürten
Tel.: +49(0)2268/90830-0

That the products described below fulfill the essential safety and health requirements of the EC directives in their conception and design as well as in the version which we have placed on the market. In the case of a modification of the product that has not been coordinated with us, this declaration loses its validity.

Type designation:

UV*pro* EKB 100

Applicable EG guidelines:

- EMV-Directive (2014/30/EU)
- Low voltage directive (2014/35/EU)
- RoHS-Directive (2011/65/EU)

Applied harmonized standards:

- **EN 55015**
- **EN 61000-3-2**
- **EN 61000-3-3**
- **EN 61347-1**
- **EN 61347-2-3**
- **EN 61547**

Kürten, 21.07.2016 — **R. Orbach**

Place / Date — Signature of **orca** GmbH Managing Director