HYGIENE OF THE DENTAL UNIT

Decontamination of the process water
Protection from biofilm and limescale
Disinfection of the suction system
Studies of the Institute of Medical Microbiology and Hygiene at the University of Vienna show that the contamination of dental treatment units with microorganisms marks a long-standing and severe problem.

Characteristics such as temperatures of 37°C within the pipe systems, relatively long standing times and backflow in handpieces promote the growth of bacteria and fungi, which can cause microbial contamination of the process water as well as of the water-bearing pipes and suction hoses.

The large surface of the hose system and the plastic which they are made of also promote the rapid growth of bacteria which start to form deposits on the walls of the hose system after only a few days.

The water passing these deposits becomes contaminated by these microorganisms, thus presenting a considerable health risk. It is therefore absolutely necessary that the supply lines of the dental unit are disinfected, for the safety of both the patient and the dental staff. However, not only bacteria and fungi can cause problems. Specially in areas with very hard water, limescale in water-bearing pipes can damage the dental unit. By using the WEK / WEK Light water decontamination systems by METASYS, the formation of limescale can be effectively prevented.

**Biofilm and limescale: No, thanks!**

**What is biofilm?**

Biofilm is a multilayered coating consisting of microorganisms, originating in the settlement of microorganisms on surfaces. Biofilms are commonly perceived as a “slimy layer” or “coating.” Extracellular Polymer Substances (EPS) form hydro gels in combination with water. Subsequently, a slimy coating develops in which nutrients and others substances are dissolved. In addition, these EPS provide a stable shape (hydrate sphere) for the system. Within biofilms dissolved substances are mainly transported by means of an equalisation of concentrations. The transport of nutrients occurs by means of water flowing within the “slimy layer.”

The biofilm contains both, areas that are supplied with oxygen (the water facing side) as well as areas not supplied with oxygen (the inner walls of the dental unit). This gives way to a versatile population of microorganisms. This complex structure can hardly be destroyed by means of ordinary disinfectants because they commonly only temporarily damage the biofilm's top boundary layers (shearing forces rip off pieces which subsequently block instruments).

**What to do against biofilm?**

- **First step** Intensive decontamination and biofilm removal: METASYS BR and GREEN&CLEAN BR
- **Second step** Permanent water decontamination: METASYS WEK / WEK Light and GREEN&CLEAN WK
Dental unit waterline treatment
Decontamination of dental process water

Water as a health risk

Dental process water shows massive contamination after longer stagnation phases. It is therefore strongly recommended to rinse the water-bearing pipes before first use after longer stagnation phases. This measure alone, however, does not suffice for the supply of hygienically clean process water at any time. Only a continuous decontamination device guarantees that no microorganisms can settle in the pipe systems of the dental unit even after longer stagnation phases (e.g. at weekends).

No chance for legionella!

Legionella infections are one of the most common health risks in the dental office. The transmission takes place through inhalation of aerosols. Aerosols can cause infections that are hazardous to human health to a varying extent. With the METASYS water decontamination systems, the risk of legionella can be successfully countered. Legionella in process water can be eliminated, even at very high levels of contamination.

Problem: Limescale formation

Calcification in the dental unit causes significant problems. Limescale deposits provide optimal conditions for the growth of germs, and also cause blockages in pipes and valves which may impair the proper function of the entire dental unit. METASYS water decontamination systems effectively prevent calcification through the addition of limescale inhibitors.

WITHOUT METASYS water decontamination system

WITH METASYS water decontamination system

The Ruhr Hygiene Institute in Marl (Germany) examined the microbiological situation within dental units. After a longer stagnation phase (Monday morning) two samples of water were taken. The first one before, the second one after flushing twice. The same samples were taken after the installation of a WEK water decontamination 3 weeks later.
WEK/WEK Light water decontamination systems

Permanent decontamination of dental process water

The water decontamination systems WEK/WEK Light are systems which effectively prevent limescale and decontaminate the process water of water-bearing pipes with the help of the GREEN&CLEAN WK disinfectant. This solution has been specially developed for WEK/WEK Light. METASYS WEK/WEK Light are generally used to supply numerous consumers (e.g. syringes, turbines, or water glass filler) in the dental unit with decontaminated water.

The German Technical and Scientific Association for Gas and Water (DVGW) has issued a regulation according to which water is not allowed to re-enter the public water system after having got into contact with patients or chemicals. This is why the WEK is equipped with an additional air gap, which guarantees the separation of contaminated water from fresh water. The WEK water decontamination system is in compliance with the DIN EN 1717.

The decontamination preparation GREEN&CLEAN WK is a concentrate based on hydrogen peroxide (2%). It is highly suitable for the continuous reduction of germs in process water. With the use of limescale inhibiting ingredients, the GREEN&CLEAN WK is furthermore effective against calcifications within the dental unit. It combines excellent disinfection effects and high material compatibility. 750 ml concentrate suffice for 63 l of dental process water.

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**WEK Water decontamination system**

- Item no.: 05020001
- Power supply: 230 V AC (floor model), 24 V AC (installation)
- Frequency: 50/60 Hz
- Max. current consumption: 0,8 A
- Permitted water pressure range: 2 - 6 bar
- Permitted air pressure range: 3,5 - 8 bar
- Operating pressure (water): 2,5 bar
- Operating pressure (air): 3 bar
- Max. water flow rate: 1 l/min (depressurized)
- Mixing ratio: 1:85 standard setting, 1:42 intensive decontamination
- Working solution: 235 ppm
- Dimensions (H x W x D): 335 x 265 x 160 mm

**WEK Light Water decontamination system**

- Item no.: 05020019 | 05020026
- Power supply: 24 V AC
- Frequency: 50/60 Hz
- Max. current consumption: 0,1 A
- Permitted water pressure range: 1 - 2,8 bar
- Permitted air pressure range: 3 - 8 bar
- Operating pressure (water): 2,5 bar
- Operating pressure (air): 3 bar
- Max. water flow rate: 6 l/min (depressurized)
- Mixing ratio: 1:85 standard setting
- Working solution: 235 ppm
- Dimensions (H x W x D): modular construction

Customized versions of the WEK/WEK Light water decontamination system are available for various dental units. The respective order numbers are listed in the price list.
Dripping instruments or unpleasantly smelling water are usually the first signs that something is wrong with the water-bearing pipes of the dental unit. The most common cause for this is biofilm on the inner surfaces of the pipe system which contaminates the dental process water. Biofilm is not only a source of infection but may also damage dental units and instruments, e.g. hand and angle pieces.

The water decontamination systems WEK/WEK Light prevent the formation of biofilm. Prior to the installation of a WEK or WEK Light, it is recommended to remove existing biofilm in the water-bearing pipes. With its biofilm removing device and the specially formulated preparation GREEN&CLEAN BR, METASYS offers the suitable tools to do so.

GREEN&CLEAN BR is a ready-to-use hydrogen peroxide solution (4%) for the removal of biofilm. Due to its pH-value, it splits the hydrate coat of the biofilm and facilitates its oxidation. This is how the GREEN&CLEAN BR disinfectant advances to the inner walls of the dental unit's pipe system and is able to remove biofilm there as well.

**The benefits of the BR Biofilm Cleaning&Removing Kit are compelling:**

The METASYS BR Biofilm cleaning device is used to decontaminate the water supply lines before a WEK water disinfection appliance is installed. The specially formulated GREEN&CLEAN BR compound removes any existing biofilm in just 30 minutes.

- Simple connection
- Easy to handle (pumps the cleaning solution automatically into the particular dental unit)
- Action time: up to one hour
- Only to be used in combination with METASYS GREEN&CLEAN BR
- Depending on the dental unit the usage of GREEN&CLEAN BR ranges from 500 ml up to 1000 ml (approx. equivalent to one bottle)
- Biologically degradable according to the EWG-guideline 84/449
H1 hygiene system

Disinfection, deodorization and defoaming of the suction system

Risk caused by backflow

The Robert Koch Institute points out that the backflow of cooling water, blood and saliva may enter the patient’s mouth. If a suction cannula is blocked by sucked in soft tissue, a backflow of contaminated liquids can enter the patient’s oral cavity through the suction pipe. This presents a risk of infection (cf. Recommendation on Infection Prevention in Dentistry, Hygiene Requirements, 2006).

The METASYS H1 hygiene system effectively prevents this path of infection. Using specially constructed suction tubes, the GREEN&CLEAN H1 preparation is atomized in retrograde directly at the suction cannula. This results in a continuous cleaning and disinfection of the dental tubes. The fully automatic H1 hygiene system is economical in its consumption and caters for optimal disinfection of the whole suction system. The suction system doesn’t need to be cleaned and disinfected manually daily and the service life of the suction tubes is extended.

<table>
<thead>
<tr>
<th>Item no.</th>
<th>H1 hygiene system with suction tube holder</th>
<th>H1 hygiene system without suction tube holder</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply</td>
<td>24 V AC</td>
<td>24 V AC</td>
</tr>
<tr>
<td>Frequency</td>
<td>50/60 Hz</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td>Max. current consumption</td>
<td>0,45 A</td>
<td>0,45 A</td>
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<tr>
<td>Average water consumption</td>
<td>ca. 2,4 l/Day</td>
<td>ca. 2,4 l/Day</td>
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<tr>
<td>Cartridge volume</td>
<td>130 ml</td>
<td>130 ml</td>
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<tr>
<td>Average refill interval</td>
<td>ca. 6 Days</td>
<td>ca. 6 Days</td>
</tr>
<tr>
<td>Dimensions (H x W x D)</td>
<td>-</td>
<td>200 x 190 x 200 mm</td>
</tr>
</tbody>
</table>
Two suction systems – one of them equipped with the METASYS H1 hygiene system – have been part of the following experiment. A test solution, enriched with microorganisms (each $10^8$ KBE ml$^{-1}$), was sucked into both of the systems. Afterwards the suction tubes were flushed with a sterile, watery solution. The rinsing solution was then collected in a sterile container and examined in regard to its microorganisms (cf. Prof. Dr. Dr. Gräf, Institute for Medical Hygiene at the University of Erlangen-Nuremberg, Germany). The sample taken from the suction tube treated with the hygiene system H1 showed a considerable reduction of microorganisms.

Therefore, it can be stated that a considerable improvement of the suction hygiene in regard to the infection hygiene can be achieved when using H1. This reduces the infection risk for patient and dental team to a minimum.

The H1 hygiene system combines perfect cleaning with highest hygiene. For the dental office, this means new hygienic standards of suction. Prevention of infection risks, highest material compatibility and reduced maintenance time speak for the carefully thought through solution of H1.

In connection with the METASYS H1 hygiene system, the cleaning and disinfection preparation GREEN&CLEAN H1 guarantees economical care and disinfection of the whole suction system especially after the removal of the suction tube. Enzymes cater for a high protein solubility and thus manage to also remove old deposits. It contains active defoamers and is biologically degradable.
Service and maintenance

**Service kit WEK**
Item no. 50050115
2 magnetic valves, 1 non-return valve, 1 filter, 3 tubes, 1 x GREEN&CLEAN WK 750 ml, 5 pcs
GREEN&CLEAN WK test strips

**Service kit WEK Light**
Item no. 50050126
1 magnetic valve, 1 non-return valve, 1 insert for filter, 1 x GREEN&CLEAN WK 750 ml, 5 pcs
GREEN&CLEAN WK test strips

**GREEN&CLEAN WK test strips**
GREEN&CLEAN WK test strips are used to conduct a visual inspection of the functionality and the effectiveness of the water decontamination system.
Item no. 40050503 - WK test strips, 25 pcs.
Item no. 40050504 - WK test strips, 50 pcs.

Cleaning and disinfection

**GREEN&CLEAN WK**
2% ready-to-use solution on hydrogen peroxide basis for the decontamination of process water and the prevention of limescale deposits in the pipe systems of dental units.
Item no. 60040100 - WK refill kit 1 (4 x 750 ml bottles)
Item no. 60040101 - WK refill kit 2 (6 x 1000 ml bottles)
Item no. 40200018 - WK dosing kit (measuring cup incl. manual, for bottle-systems)

**GREEN&CLEAN BR**
4% hydrogen peroxide solution for the removal of biofilm in the waterbearing pipes of the dental unit.
Item no. 60040300 - BR Biofilm cleaning solution (2 x 1000 ml bottles)

**GREEN&CLEAN H1**
Disinfectant for the METASYS automatic Hygiene System H1
Item no. 60010021 - refill kit (4 x 500 ml pouches)

METASYS - your strong partner

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