DR. SCHMELZ
KOMPETENZZENTRUM
technische Hygiene & angewandte Mikrobiologie

CLINICAL AND PRACTICAL HYGIENE
PREPARATION OF DENTAL UNITS
RISK ASSESSMENTS
HYGIENE
PROTOCOLS
ROOM AIR SYSTEMS
EXPERT REPORTS AS PER VDI 6022
MILDEW TREATMENTS
SYSTEM OPTIMIZATIONS
DRINKING WATER
SYSTEMS
EXPERT REPORTS AS PER VDI 6023
SYSTEM DISINFECTIONS
REORGANIZATION
CONCEPTS SERVICING
MAINTENANCE AS PER VDI
806-5
BATHING POOL
SYSTEMS HYGIENE
PROTOCOLS
PREPARATIONS
TRAINING
SAMPLING TRAINING HYGIENE
INSTRUCTION

Dr. Schmelz GmbH, Buchenweg 20, 34323 Malsfeld, Germany

STEURER Trocknungs- und Aufbewahrungssysteme GmbH
Staudenstrasse 34
6844 Altach | Vorarlberg | Austria

Part of the **WINTERSTEIGER** Group
WINTERSTEIGER AG
4910 Ried im Innkreis | Upper Austria | Austria

Expert Assessment from the Perspective of Microbiology and Hygiene

Assessment of the Expert Opinion "CFD Calculation CUBUSAN" from the company SSD Beratende Ingenieure ZT GmbH Walgaustraße 41 – 6832 Röthis, Austria Mr. Norbert Prochaska (Dipl.-Ing.)

The abovementioned report dated 2/5/2021, prepared by Mr. Norbert Prochaska, describes the distribution of a defined particle size in the room in the event of a defined supply of hydroxyl radicals generated by the STEREX process with the CUBUSAN device. In addition to the report dated 2/5/2021, on 2/2/2021 a video conference was held in which the dynamic modeling of the flow calculation was presented.

The particle size is assumed to be the hydroxyl radical, as well as the hydroxyl radical in the cluster with 30 to 50 water molecules.

It is determined that a 10% flooding of the room with hydroxyl radicals is achieved when the plasma source (CUBUSAN device) is activated.
In the event of a lead time of 30 min, there is a 50% penetration of the air with plasma reaction products (hydroxyl radicals).

The report is of a high professional and factual quality and shows the hydroxy radical distribution depending on various ambient conditions (with or without lead time of the plasma generator; and/or opening of a door). The positioning of the plasma generators can be dynamically modeled and it is therefore possible to determine the optimum position of the plasma generators.

The seating area of a restaurant was used as the basis. This room has an enclosed volume of approximately 420 m³.
According to the previous experimental determination of an equivalence volume of 120 m³ per plasma generator, this means that approximately four devices are required.

The dynamic modeling of the features of the flow was carried out in the normal indoor climatic range, 30 to 60% rel. humidity; 18 to 24°C air temperature, standard ambient pressure of 1013 hPa.

The dynamic modeling shows that hydroxyl radicals are distributed within a radius of around 4 m around the CUBUSAN device.
If the CUBUSAN devices are positioned near to the ceiling of the room at a height of 2.5 to 3.0 m with blow-out direction to the side, the distribution is downwards.
This means that one device can supply a diameter of approximately 8 m with hydroxyl radicals.
In a square or rectangular room, the positioning should be in the center of the room in a symmetrical row. An asymmetric distribution will tend to result in an uneven distribution of the hydroxyl radicals in the room.
The spacing of the devices in a row should not exceed 8 m.

Furthermore, it has been shown that opening a door only has a marginal influence on the plasma distribution and density. Disturbances of this kind are compensated for by the hydroxyl radicals in the room within a few minutes.

Within an hour there is 10000-fold elimination of airborne microorganisms.
The correct wearing of a mask results in 100-fold elimination of airborne microorganisms.

This means that the microbiocidal power of the hydroxyl radicals is up to 100-times stronger than the filtration of respirator masks.

Against this background, the use of masks in (depending on the number of persons present; > 3.5 m² per person is recommended and the local, official guidelines) can be stopped if the STEREX plasma disinfection process in the CUBUSAN device is used according to this recommendation.

The devices are suitable for constant use. In the event of use in seating areas or meeting rooms, the device should be activated around 30 to 60 minutes before the event starts so that the device can establish a stable equilibrium of hydroxyl radicals.

Regular ventilation maneuvers are required irrespective of the use of the CUBUSAN device. The ventilation requirement is mainly determined using the carbon dioxide content in the air. For example, according to German recommendations, there is already an urgent need for ventilation at 1200 ppm carbon dioxide.

Ventilation maneuvers of this kind should be carried out by letting in short bursts of air or as transverse ventilation. This does indeed result in a dilution of the hydroxyl radicals, but even in the event of transverse ventilation around 25% of the initially available hydroxyl radicals will remain. The equilibrium will be restored very quickly because the hydroxyl radicals that are already available act as catalysts for the formation of new hydroxyl radicals.

When viewed as a whole, the recommendation is to position the CUBUSAN devices at intervals of < 8 m close to the ceiling. In the event of normal room heights, positioning at a height of 2.5 to 3.0 m above the ground is therefore recommended. The blow-out openings should be directed downwards so that the volume flow escapes downwards from the device in a radial manner from the side.
There should be at least one device for 120 m^3 enclosed volume of the room. The devices should be positioned centrally in the room in a row, as this allows for optimum homogeneity in the distribution of the hydroxyl radicals.

2/16/2021

Priv.-Doz. Dr. med. Ulrich F. Schmelz

CEO Dr. Schmelz GmbH Malsfeld
Doctor specializing in medical microbiology & infection epidemiology; graduate in food chemistry, graduate in engineering (university of applied sciences) process engineering