

# Beghelli

Sanifica **ARIA**  
Beghelli

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## SANITIZACE PROSTŘEDÍ: UV-C TECHNOLOGIE REDUKUJÍCÍ RIZIKO NÁKAZY V OBYTNÝCH A PRACOVNÍCH PROSTŘEDÍCH

### BEGHELLI PRODUKDY navržené pro ČIŠTĚNÍ VZDUCHU

Nové čistící systémy Beghelli, SanificaAria, používají systém axiálních ventilátorů při ošetřování vzduchu za použití ultrafialové lampy (kazety) v pásmu C (UV-C).

Vzduch v přítomný v prostředí je nahnán do komory, ve které je aktivní UV-C zdroj. Zde se odehrává čistící proces. Po dokončení je vzduch vypuštěn a vrácen do okolního prostředí.

Charakteristiky a efektivita čištění vzduchu za pomoci ultrafialové technologie jsou popsány v příložených zdrojích.

### ČIŠTĚNÍ VZDUCHU za použití UV-C TECHNOLOGIE

UV-C technologie byla využívána po dlouhé roky při ošetřování tekutin, jelikož byla prokázána účinnost UV-C na DNA virů při inaktivaci replikace buněk.

Toto podporují dva důležité dokumenty, které aktualizují úvahy již přítomné v rozsáhlé vědecké literatuře, zvláště té vztahující se k událostem roku 2020 a COVID-19:

- CIE Position Statement on Ultraviolet (UV) Radiation to Manage the Risk of COVID-19 Transmission - May 12, 2020 (Annex 1),
- ISS COVID-19 Report no. 25/2020 of 15/05/2020 (ISS – Italian Istituto Superiore di Sanità):

*"UV-C záření má schopnost modifikovat DNA nebo RNA mikroorganismů, čímž předchází jejich reprodukci a škodlivosti. Z tohoto důvodu je tedy používáno při různých příležitostech, jako je dezinfekce jídla, vody a vzduchu.*

*In vitro, studie jasně dokázaly, že UV-C záření může inaktivovat 99.99% virů chřipky v aerosolech. Virucidní a baktericidní schopnosti UV-C byly demonstrovány ve studiích o viru MHV-A59, viru analogickém u hlodavců k MERS-CoV a SARS-CoV-1.*

*Aplikace kapének obsahujících MERS-CoV vyústila v nedetekovatelné úrovni viru MERS-CoV po pouhých 5 minutách po vystavení UV-C zářiči (redukce větší, než 99.99%) a také byla zjištěna účinnost při sterilizaci vzorků krve.*

*Obzvláště byla demonstrována inaktivace větší než 95% u viru chřipky H1N1, aerosolizovaného nebulizérem, schopným produkovat aerosolové kapénky velikosti podobné té, kterou produkuje lidský kašel a dýchání.*





# Beghelli

- Bezpečnost použití při přítomnosti lidí -> emise ozonu:

Norma IEC 60335-2-65: 2002 + AMD1: 2008 + AMD2: 2015 (článek 32.101)

*"Household and similar electrical appliances - Safety - Part 2-65: Particular requirements for air-cleaning appliances"*

**32.101** The ozone concentration produced by air-cleaning appliances shall not be excessive.

*"Compliance is checked by the following test, which is carried out in a room without openings having dimensions of 2.5 m x 3.5 m x 3.0 m, the walls being covered with polyethylene sheet."*

The device was subjected to an analysis of the ozone emission in order to check for any emissions, despite the use of lamps with intrinsic safety features (declarable "ozone free" with an emission lower than 0.01g / KWh).

The tests have shown that the ozone concentration in 24 hours (Standard IEC 60335-2-65: 2002 + A1: 2008 + A2: 2015 § 32.101 + UNI EN 14625: 2012) is equal to 8.6 µg / m<sup>3</sup> compared to of an allowed limit of 100.

(Report No. 20COA01109 of 11/11/2020)

With regard to evaluations on the effectiveness of use, it was necessary to combine skills in the fields of virology and risk assessment in workplaces.

Beghelli identified these skills within the University of Padua, and in particular at the Department of Molecular Medicine and the Department of Industrial Engineering - Civil and Industrial Safety Engineering.

The study commissioned the researchers to have as its object "Reduction of microbiological risk in confined environments through the use of" SanificaAria 30 ".

This result of the studies (Scientific Report of 10/09/2020) can be summarized as follows:

*"In conclusion," SanificaAria 30 "guarantees the inactivation of Gram-positive and Gram-negative bacteria and fungi in 1 hour, also reducing the risk of respiratory infection caused by these microorganisms. Non-enveloped viruses such as Adenoviruses are particularly difficult to control due to their innate resistance to UV-C radiation. In fact, in the worst case, "SanificaAria 30" can reduce the risk of Adenovirus infection after 5 hours of activation. On the other hand, enveloped viruses such as the Coronavirus SARS-CoV-2 which causes COVID-19 are more sensitive to UV-C radiation and the risk of infection by these pathogens is reduced to approximately zero after two hours of activating the device."*

It should be noted that the aforementioned assessments were carried out with specific reference to the flow rate of the product in cubic meters / hour, assuming the coexistence of infectious and healthy people in view of a precise definition of the actual quantity of "infectious droplets" issued by a sick subject who breathes 0.45m<sup>3</sup> / hour and can potentially breathe, sneeze and cough.



## CONCLUSIONS

Performance and safety of the Beghelli SanficaAria products have been tested on the basis of known legislation and using third-party testing bodies of recognized competence. Information is available to customers on the packaging and also on the dedicated company website.

With regard to use in the field, illustrative information and criteria have been provided that can allow the user to identify the best positioning according to the various environmental situations.

The technical file containing the entire set of reports mentioned in this document is available upon agreement with the Company and is subject to confidentiality agreements.

BEGHELLI SPA  
Ing. Fabio Pedrazzi  
Valsamoggia, 02/03/2021



International Commission on Illumination  
Commission Internationale de l'Eclairage  
Internationale Beleuchtungskommission

## **CIE Position Statement on Ultraviolet (UV) Radiation to Manage the Risk of COVID-19 Transmission**

May 12, 2020

### **Introduction**

The coronavirus disease (COVID-19) pandemic has accelerated the search for environmental controls to contain or mitigate the spread of the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) responsible for the disease. SARS-CoV-2 is usually transmitted from person to person by contact with large respiratory droplets, either directly or by touching virus-contaminated surfaces (also denoted as fomites) and subsequently touching the eyes, nose or mouth. Importantly, there is growing evidence of virus transmission via the airborne route as the large respiratory droplets dry out and form droplet nuclei which can remain airborne for several hours. Depending on the nature of the surface and environmental factors, fomites can remain infectious for several days (van Doremalen, 2020).

The use of germicidal UV radiation (GUV) is an important environmental intervention which can reduce both contact spread and airborne transmission of infectious agents (like bacteria and viruses). GUV within the UV-C range (200 nm–280 nm), primarily 254 nm, has been used successfully and safely for over 70 years. However, GUV must be knowledgeably applied with appropriate attention to dose and safety. Inappropriate GUV application can present human health and safety issues and produce insufficient deactivation of infectious agents. Application in the home is not advisable and GUV should never be used to disinfect the skin, except when clinically justified.

### **What is GUV?**

Ultraviolet radiation is that part of the optical radiation spectrum that has more energy (shorter wavelengths) than visible radiation, which we experience as light. GUV is ultraviolet radiation that is used for germicidal purposes.

Based on the biological impact of ultraviolet radiation on biological materials, the ultraviolet spectrum is divided into regions: UV-A is defined by CIE as radiation in the wavelength range between 315 nm and 400 nm; UV-B is radiation in the wavelength range between 280 nm and 315 nm; and the UV-C wavelength range is between 100 nm and 280 nm. The UV-C part of the UV spectrum has the highest energy. Whilst it is possible to damage some microorganisms and viruses with most of the ultraviolet radiation spectrum, UV-C is the most effective and hence UV-C is most commonly used as GUV.

The radiant exposure required for the deactivation of an infectious agent by 90 % (in air or on a surface) depends on the environmental conditions (such as relative humidity) and the kind of infectious agent. It typically ranges between 20 J/m<sup>2</sup> and 200 J/m<sup>2</sup> for mercury lamps predominantly emitting radiation at 254 nm (CIE, 2003). Previously, GUV of 254 nm has been shown to be effective in disinfecting surfaces contaminated with the Ebola virus (Sagripanti and Lytle, 2011; Jinadatha et al., 2015; Tomas et al., 2015). Other studies have demonstrated