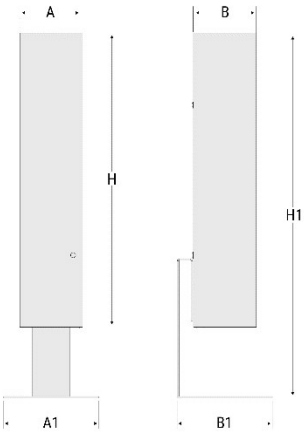
INFORMATIVE NOTE

Valsamoggia, 29/07/2020

SUBJECT: Germicidal irradiation assessment of the UV-C device "SanificaAria 30":

- **Evaluation of antiviral activity against Coronavirus and Adenovirus**
- **ISO 15714: 2019 Standard - Test microorganisms - Coronavirus cluster impact**
- **Conformity to clause 32.102 of IEC 60335-2-65:2002**

Beghelli developed a system called SanificaAria 30, with the technical features listed in figure 1, that consists of an axial fan suction system that introduces air into the closed chamber which contains the UV-C source, where the sanitization process is carried out:



TECHNICAL FEATURES SanificaAria 30
Power supply: 230Vac ±10%, 50÷60Hz
Local switch on the power cord
Absorption: 24W
UV-C Lamp: TC 2G11 18W
Wave length UV-C: 254nm
Sanitization airflow rate: 30m³/h
Radiant power UV-C: 5,5W
Ozone Free UV-C Lamp
Cartridge life: 12 months
Noise level: 40dB(A) at 1 meter
Weight: 3,5kg
The product can be classified as an air purifier according to the norm IEC 60335-2-65 'Household and similar electrical appliance - safety - part 2-65 particular requirements for air cleaning appliances'

Dimensions mm						Sanitization airflow rate
A	B	H	A1	B1	H1	
100	100	475	152	152	584	30 m³/h

Figure 1

The product can be classified as an air purifier according to the norm IEC 60335-2-65:2002 "*Household and similar electrical appliance - safety - part 2-65 particular requirements for air cleaning appliances*".

EVALUATION OF ANTI-VIRAL ACTIVITY

The tests to evaluate the anti-viral efficacy of the SanificaAria 30 Beghelli system were carried out at the Microbiology and Virology Laboratory of UNIMORE - University of Modena and Reggio Emilia.

The activity involved the use of 2 types of viruses (Adenovirus and OC43, Coronavirus HCov-OC43 very similar to the HCoV-SARS-2 responsible for CoViD-19).
The virus used in this study is the human Coronavirus HCov-OC43 which has an extremely high homology of structure with the virus responsible for CoViD-19, HCoV-SARS-2, both from a phylogenetic and molecular point of view.

Since germicidal treatments act with non-specific mechanisms, morphologically similar viruses respond in a similar way to inactivation. Therefore, HCoV-OC43 has been used in several viral persistence / inactivation studies as a substitute for the highly pathogenic Coronaviruses SARS-1, SARS-2 and MERS.
In addition, AdenoVirus-5 (AdV) was also used, having much greater resistance than that of HCoV-OC43. It is required for certification tests for virucidal systems according to UNI EN standards.

The test results showed that the virucidal action of SanificaAria 30 is as follows:

CORONAVIRUS HCoV-OC43: deactivation percentage 99.7% (logarithmic reduction 2.5)
ADENOVIRUS AdV-5 : deactivation percentage 94.4% (logarithmic reduction 1.25)

(ENCL. 1: TPM/UNIMORE Report - Cover pages)

EVALUATION OF ANTI-MICROORGANISM ACTIVITY

The scope of this project is to assess the germicidal activity of the device against microorganisms that differ from each other in terms of resistance to UV-C light itself.

The analyses are carried out at the UNI CEI EN ISO / IEC 17025: 2005 accredited laboratory Tecnal srl, in collaboration with Gelt International srl, between 12/06/2020 and 13/07/2020.

The test is performed following the prescriptions, as applicable, of the technical norm ISO 15714: 2019 *Method of evaluating the UV dose to airborne microorganisms transiting in-duct ultraviolet germicidal irradiation devices*. The norm describes a method in laboratory to assess the performance of ultraviolet germicidal irradiation (UVGI) devices which will be mounted in-duct in heating, ventilating and air-conditioning (HVAC) systems.

The microorganisms described at chapter 6 of the norm are used for the test, and they are listed in table 1.

Table 1: test microorganisms, as per chapter 6 of the ISO norm.

TEST MICROORGANISM	MICROORGANISM REFERENCE	GROUP	DOSE D90* (J/m^2)
Serratia marcescens	ATCC 13880	Gram negative bacteria	< 25
Bacillus subtilis	ATCC 6633	Gram positive bacteria	25 ÷ 120
Cladosporium sphaerospermum	ATCC 11289	Fungus	> 120

* UV-C effective dose necessary for the inactivation of the 90% of the microorganisms.

The results of the present study confirm that the SanificaAria 30 device by Beghelli has an effective UV-C dose between 25 and 120 J / m^2, inactivating up to 90% of the Gram positive microorganisms and up to 99% of the Gram negative test microorganisms. The test fungus, *Cladosporium sphaerospermum*, is inactivated no more than 33% since it would actually require higher UV doses.

The Annex C of the ISO 15714: 2019 reports a long list of scientific literature data relating to the UV-C doses (D90) required to inactivate the 90% of different microorganisms, bacteria, viruses, fungi and others. On the basis of the data obtained from the laboratory tests which show a proven ability of the SanificaAria 30 system to express an effective D90 dose of about 120 J/m^2, it is possible to point out a list of microorganisms including CORONAVIRUS which on the basis of these literature data, can be inactivated by the same system.

(ENCL. 2- TECNAL Report – Cover page)

SAFETY OF UV-C RADIATION EMISSIONS

The product have been tested by IMQ laboratories to positively verify the conformity to the requirement of IEC 60335-2-65 as far as the safety of the UV-C radiation emission is concerned (sub clause 32.102).

(ENCL. 3 - IMQ Test Report – Cover page)

BEGHELLI SPA
Ing. Fabio Pedrazzi

ENCLOSED:

- TPM/UNIMORE Report- Cover pages (Encl. 1)
- TECNAL Report – Cover page (Encl. 2)
- IMQ Test Report – Cover page

REPORT FINALE

Valutazione trattamento virucida ad opera del dispositivo SanificAria 30 sull'aria ambientale per mezzo di radiazioni UVc

Report n°: MS2_2020_R42
Edizione: 01
Pagina: 1 di 3

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Ed.	Report n°	Data	Descrizione
01	MS2_2020_R42	28/07/2020	Prima edizione

…OMISSIS….

Dipartimento Chirurgico, Medico, Odontoiatrico e di Scienze Morfologiche con Interesse Trapiantologico, Oncologico e di Medicina Rigenerativa
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Contratto di ricerca tra l'Università degli Studi di Modena e Reggio Emilia, Dipartimento di Dipartimento Chirurgico, Medico, Odontoiatrico e di Scienze Morfologiche con Interesse Trapiantologico, Oncologico e di Medicina Rigenerativa e la Fondazione DEMOCENTER-Sipe di Modena

Valutazione dell'attività antivirale nei confronti di AdV e di HCoV-OC43 di un sistema germicida a radiazioni UV su un materiale (+ controllo) per un unico tempo di esposizione ed ad un'unica distanza)

RELAZIONE FINALE

INTRODUZIONE

Il virus utilizzato in questo studio è il Coronavirus umano HCov-OC43 che ha una omologia di struttura estremamente alta con il virus responsabile della CoViD-19, HCoV-SARS-2, dal punto di vista sia filogenetico che molecolare. Essi infatti appartengono entrambi al gruppo β-Coronavirus in una posizione estremamente vicina nell'albero filogenetico. L'omologia è tale che alcuni anticorpi, anche altamente specifici contro HCoV-OC43, riconoscono anche SARS-2. Questo indica come le proteine, che sono il costituente principale dell'impalcatura della particella virale e ne determinano la resistenza, siano estremamente simili tra i due virus. Poiché i trattamenti germicidi agiscono con meccanismi non specifici, virus morfologicamente simili rispondono in maniera sovrapponibile all'inattivazione. Pertanto, HCoV-OC43 è stato utilizzato in diversi studi sulla persistenza/inattivazione virale come modello

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ENCLOSED 2

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Germicidal irradiation assessment of the UV-C device "SanificaAria 30"

BEGHELLI SPA

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20TR0026/01

B.U. PRODUCT CONFORMITY ASSESSMENT - LIGHTING SECTOR

TEST REPORT

RAPPORTO DI PROVA

No. AI20-0053702-01

Household and similar electrical appliances - Safety - Part 2: Particular requirements for air-cleaning appliances performed in accordance with

IEC 60335-2-65:2002+AMD1:2008+AMD2:2015 (subclause 32.102)

Elettrodomestici e apparecchi simili – Sicurezza – Parte 2: prescrizioni particolari per apparecchi di depurazione dell'aria in conformità a IEC 60335-2-65:2002+AMD1:2008+AMD2:2015 (paragrafo 32.102)

PRODUCT *PRODOTTO*	Air-cleaning device *Dispositivo per la sanificazione dell'aria*
MODEL(s) TESTED *MODELLO(I) PROVATO(I)*	SANIFICA ARIA 30
TRADE MARK(s) *MARCHIO*	BEGHELLI

APPLICANT *RICHIEDENTE*	Beghelli S.p.A. - Via Mozzeghine, 13/15 - 40053 Valsamoggia – Località Monteveglio (Bologna) Italy

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Approved by *Approvato da*	Giacomo Barale *[Laboratory Manager] [Responsabile di Laboratorio]*	Giacomo Barale

Revision Sheet *Indice di revisione*

Release No. *Edizione Nr*	Date of issue *Data di emissione*	Revision Description *Descrizione della Revisione*
Rev. 0	2020, 06th July *06 luglio 2020*	First edition *Prima emissione*

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Mod. TRF983/9