

Test 3: Evaluation of Airborne Microorganisms inactivation transiting in-duct on a Light Progress UVGI air purifier according to ISO 15714:2019

TECNAL Srl - laboratory accredited by ACCREDIA (nr 0299 L) UNI CEI EN ISO/IEC 17025:2018



TESTS PARAMETERS:

Name of product tested: UV FAN-XS

Period of analysis: November 2020

Microorganisms Tested:

- *Serratia Marcescens* ATCC13880
- *Bacillus Subtilis* ATCC6633
- *Cladosporium sphaerospermum* ATCC11289

UV-C Device features:

- UVC lamp power: 40W
- - Power supply: 230 Volt -50/60Hz -40Watt
- - Maximum AIR FLOW rate: 125 m³/h
- - Flow Speed: 2m/sec
- - Passage Section area: 0.0166 m²

Environmental Conditions:

Temperature: 25°C±2°C

Relative Humidity: 50% ±10%

Experiment Method and Goals:

Besides certifying an Air Purifier itself, the main goal was to assess the performance of our UVGI devices for air disinfection, which are usually mounted in AHUs or duct in heating, ventilating and air-conditioning (HVAC)

Bacterial strains were initially reconstituted in broth culture; then the microorganisms are grown on plates; until the dilution obtained is the desired CFU/ml concentration for the inoculum. The microorganisms are then inserted in the air purifier by an aerosol generator; using a Anderson impactor with the cultivation soil plates provided for the microorganism, performs preliminary flow checks of the flow generator.

Connect the aerosol generator in the inlet hole and the impactor Anderson in the output hole of the device and start collecting the microorganisms following the operational protocol as per indications of point 7.3 of ISO 15714:2019 protocol.

The test is performed 3 times both with the UVC light OFF and ON.

The plates are finally placed to incubate for 24 -48 hrs at 32°C±1°C. For *Cladosporium Sphaerospermum*: 72/120 hours at 25°C±1°C.

TEST RESULTS:

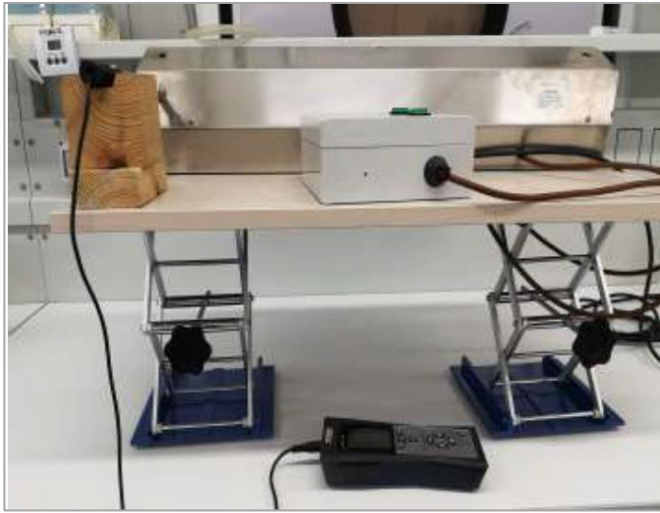
The percentage of inactivation of aero dispersed microorganisms foreseen ISO 15714:2019 technical standard; specifically, the following results have been obtained:

Serratia Marcescens bacterial inactivation: 100% - calculated UVC dose: D=11.58 J/m²

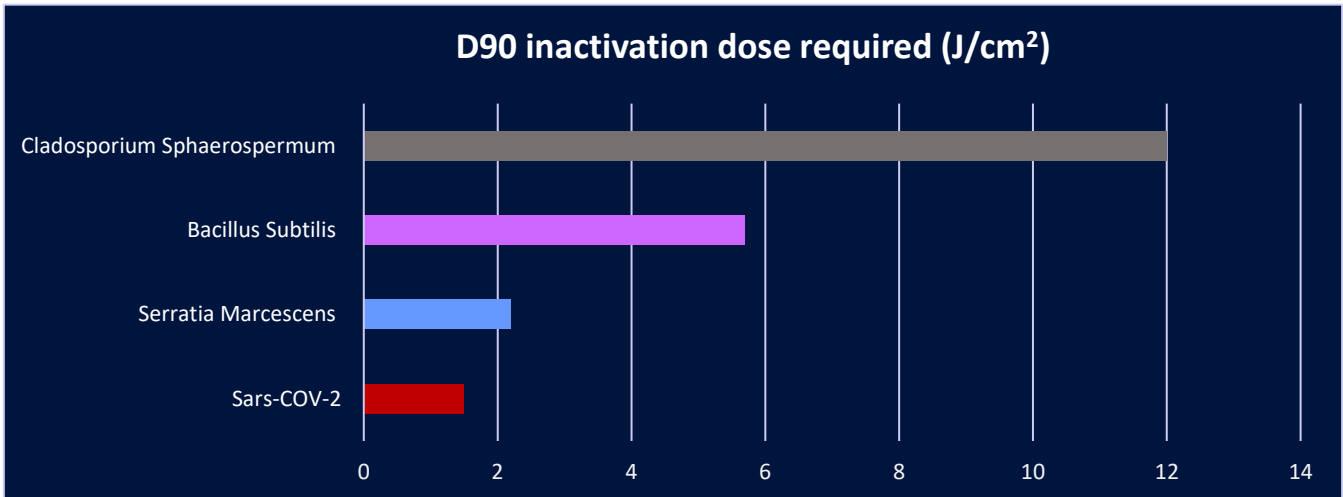
Bacillus Subtilis bacterial inactivation: 99.99% - calculated UVC dose: D=56.56 J/m²

Cladosporium Sphaerospermum inactivation: 44.1% - calculated UVC dose: D=276.53 J/m².

Germicidal efficacy has been fully demonstrated.



1- <i>Serratia marcescens</i> :	
<i>ufc/m³</i> valore medio lampada UVC spenta	<i>ufc/m³</i> valore medio lampada UVC accesa
UV LAMP OFF	32.596
UV LAMP ON	1
INACTIVATION RATE (punto 3.1.9)	
$N0/N\% = (N0-N)/N0 \times 100$	$\text{Log}(N0/N)$
100,0	4,6
2- <i>Bacillus subtilis</i> :	
<i>ufc/m³</i> valore medio lampada UVC spenta	<i>ufc/m³</i> valore medio lampada UVC accesa
UV LAMP OFF	32.045
UV LAMP ON	2
INACTIVATION RATE (punto 3.1.9)	
$N0/N\% = (N0-N)/N0 \times 100$	$\text{Log}(N0/N)$
99,99	4,14
3- <i>Cladosporium sphaerospermum</i> :	
<i>ufc/m³</i> valore medio lampada UVC spenta	<i>ufc/m³</i> valore medio lampada UVC accesa
UV LAMP OFF	5.583
UV LAMP ON	3.124
INACTIVATION RATE (punto 3.1.9)	
$N0/N\% = (N0-N)/N0 \times 100$	$\text{Log}(N0/N)$
44,1	0,25



LIGHT PROGRESS UV-C sources are capable of irradiating the volume of air treated with a sufficient amount of energy to break down up to *99.9% of microorganisms tested by Tecnal, laboratory accredited UNI CEI EN ISO / IEC 17025: the laboratory carried out germicidal efficiency test using various microorganisms such as: *Serratia marcescens*, *Bacillus subtilis*, *Cladosporium sphaerospermum*, as prescribed by the ISO 15714 Standard. These elements are representative of gram positive bacteria, gram negatives and fungi. Their reduction percentage it is a guarantee of the product's ability to break down a wide range of bacteria, viruses, including coronaviruses and other microorganisms that are much less resistant to UV-C wavelegth (see complete chart, page 3).