

## TEST

Radiometric characterization and dose determination of air disinfection equipment.

- Measurement of the UV emission spectrum in the range [200-600] nm of the radiation source that incorporates the product.
- Measurement of the irradiance received in different areas of the product and calculation of the dose received.

## APPLICANT'S INFORMATION

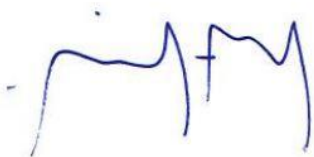
Name: ACB ILUMINACION, S.L.

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Tel: +34 96 277 90 21

Test date: 18/12/2020 and 22/12/2020

Tested by:



Teresa Molina Jiménez  
Laboratory Technician  
28/12/2020

Approved by:

Elena Sanjuán Sánchez  
Laboratory Manager  
05/01/2021

The test results of this report relate only to the tested sample identified in this report. This report will not be valid if it has erasures or alterations.

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## 1. SAMPLE DESCRIPTION

**Identification:** EE200473-1; EE200473-2; EE200473-3; EE200473-4

Test sample EE200473 with parts: EE200473-1; EE200473-2; EE200473-3; EE200473-4

**Descripción:** Machine intended for air disinfection using UV-C radiation

Information provided by the applicant:

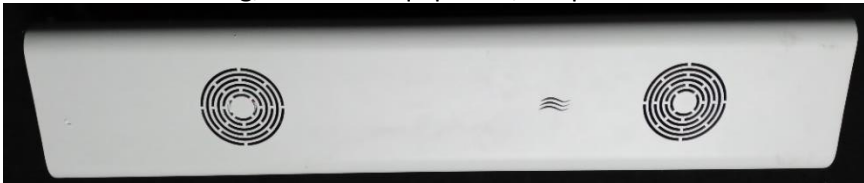
*Dimensions: (LxWxH) (83 x 17 x 5) cm*

*Name: AIR CLEANER ACB*

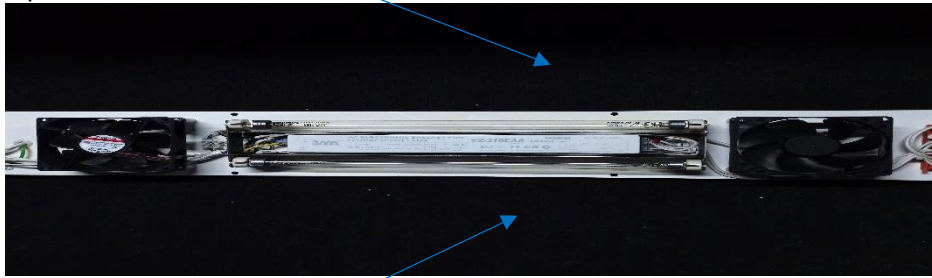
*Model/Reference: A39272B (Turbo Air Cleaner)*

*This model is representative of the models: A39272N (Turbo Air Cleaner) / A383320B (Fosca Air Cleaner) and A383320N (Fosca Air Cleaner)*

EE200473-1: housing, electrical equipment, lamps and forced ventilation system.



EE200473-2: lamp PHILIPS TUV 16W G16 T5



EE200473-3: lamp PHILIPS TUV 16W G16 T5

EE200473-4: remote control



### Characteristics of the machine radiation emissions

The machine incorporates two UV-C sources that turn on as the machine is turned on with the remote control.

### Machine operating conditions

The machine only has one operating mode in which the lamps stay on continuously for a set time (defined using the remote control, to choose between 2h, 4h or 8h).

### Identifying marks

Die-cut logo on the case (EE200473-1):



Label on remote control (EE200473-4)



**Date of receipt:** 09/12/2020

**Sample supplier:** The applicant.

## 2. TEST

### **2.1 Testing method**

The spectral power distribution of the radiation emitted by the sample is measured at different points of the equipment and at different distances.

The detector is placed in different areas of the sample, at different distances and with different orientations. At each testing point, the spectral power distribution is measured (in the range 200 to 600 nm) with an spectroradiometer, three measurements are recorded and the average is calculated.

During the test, the stray light and non-desired reflections are minimized so that they do not reach the detector.

### **2.2 Lamp aging**

The Applicant informs that the lamps have been aged for at least 100 hours (as indicated by ISO 15727: UVC DEVICES: MEASURING THE OUTPUT OF THE UV-C LAMP) before delivering the sample to the laboratory for measurements.

### **2.3 Test equipment**

- Spectroradiometer StellarNet Blue-Wave UV-50 (E0015). S/N: 16020409  
Calibration certificates nº P189254.DMSI.001; P198212-DMSI/1
- Thermo-hygrometer PCE 313-A (E0020). S/N: Q899064  
Calibration certificate: C-10017.00006
- Calliper Insize 1108-150 (E0050). S/N: 0810162082  
Calibration certificate: 8852-12578

### **2.4 Environmental conditions during the test**

Temperature:  $(24.78 \pm 0.40)$  °C

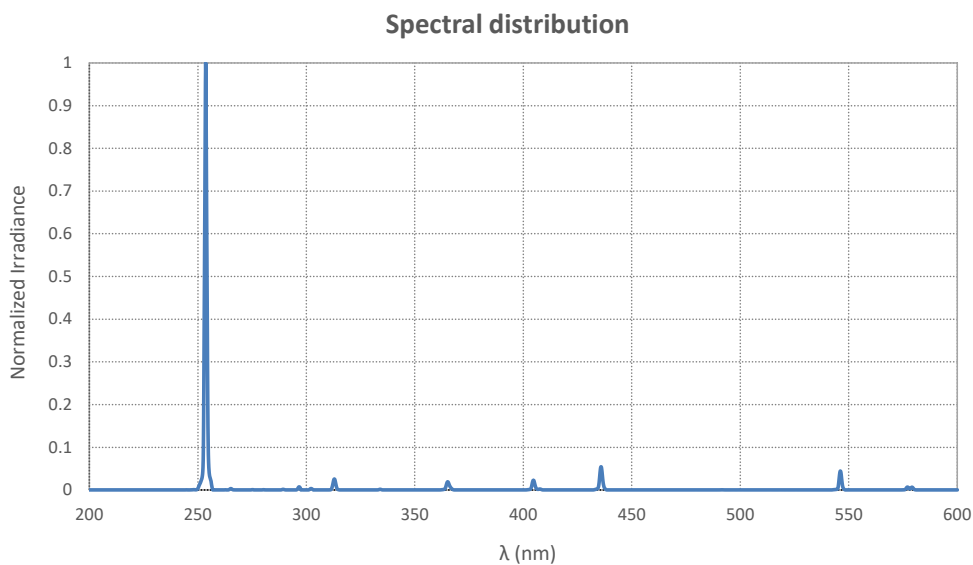
Humidity:  $(38.7 \pm 2.9)$  % Hr

### 3. RESULTS

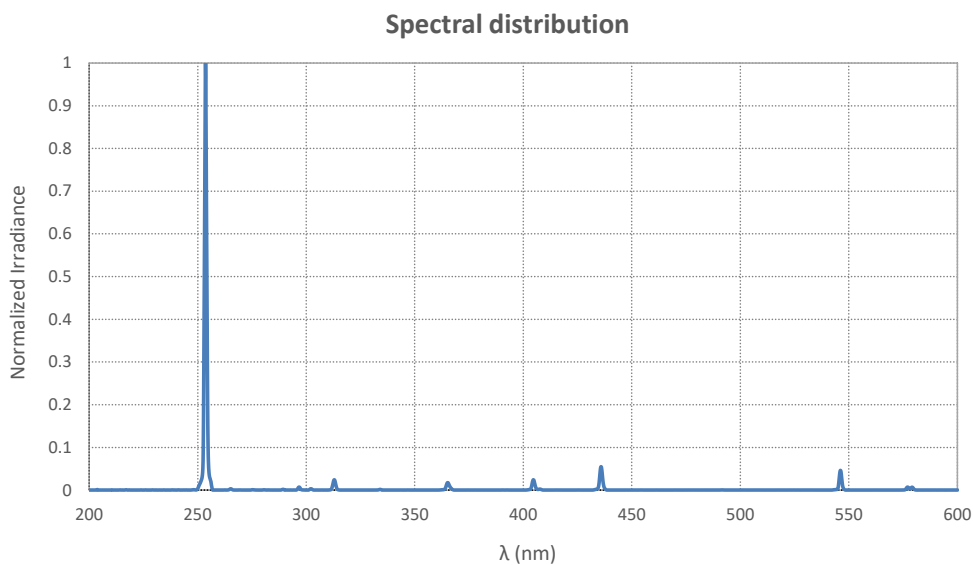
#### 3.1 Normalized spectral distribution of the lamps.

Spectral distribution measured in the range 200 nm to 600 nm (normalized) of the lamps.

EE200473-2

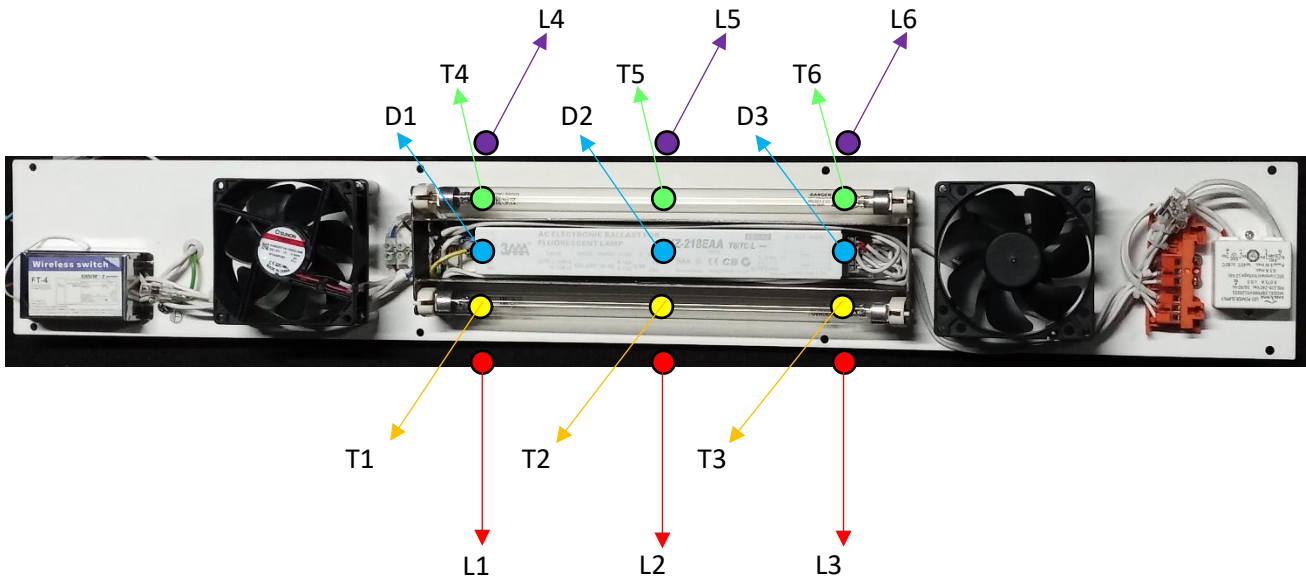


EE200473-3



### 3.2 IRRADIANCE LEVELS MEASURED IN DIFFERENT ZONES AND CALCULATION OF THE DOSE IN THE MEASURED ZONES

#### Measurement áreas



- D1, D2 and D3, measurements over the driver, ortogonal distance to the lamps 2.60 cm. Over the central axis of the driver, at the maximum height allowable inside the housing.
- T1, T2 and T3, measurements over the lamps, at 0.80 cm to the lamp surface, at the maximum height allowable inside the housing in the vertical direction.
- L1, L2 and L3, measurements at 4.50 cm to the lamp surface, at the maximum distance allowable inside the housing in the horizontal direction.
- T4, T5 and T6, measurements over the lamps, at 0.80 cm to the lamp surface, at the maximum height allowable inside the housing in the vertical direction.
- L4, L5 and L6, measurements at 4.50 cm to the lamp surface, at the maximum distance allowable inside the housing in the horizontal direction.

Below is the table of the Irradiance measured in the different zones and their expanded uncertainties<sup>[1]</sup>.

Zone: driver		D1		D2		D3	
Wavelength range	Measurement position	W/m <sup>2</sup>	U(W/m <sup>2</sup> )	W/m <sup>2</sup>	U(W/m <sup>2</sup> )	W/m <sup>2</sup>	U(W/m <sup>2</sup> )
UVC [200-280] nm	Over driver	4.05	0.95	5.4	1.3	4.17	0.97
UVC [250-256] nm		3.98	0.95	5.4	1.3	4.07	0.97
<b>253.6 nm</b>		3.23	0.28	4.36	0.37	3.30	0.28

Zone: over lamp EE200473-3		T1		T2		T3	
Wavelength range	Measurement position	W/m <sup>2</sup>	U(W/m <sup>2</sup> )	W/m <sup>2</sup>	U(W/m <sup>2</sup> )	W/m <sup>2</sup>	U(W/m <sup>2</sup> )
UVC [200-280] nm	At 8 mm	58	14	86	19	64	15
UVC [250-256] nm		58	14	86	19	63	15
<b>253.6 nm</b>		46.5	4.0	65.2	5.6	50.5	4.3

Zone: next to lamp EE200473-3		L1		L2		L3	
Wavelength range	Measurement position	W/m <sup>2</sup>	U(W/m <sup>2</sup> )	W/m <sup>2</sup>	U(W/m <sup>2</sup> )	W/m <sup>2</sup>	U(W/m <sup>2</sup> )
UVC [200-280] nm	At 45 mm	24.3	5.8	44	10	22.6	5.4
UVC [250-256] nm		24.1	5.8	44	10	22.6	5.4
<b>253.6 nm</b>		19.6	1.7	35.0	3.0	18.3	1.6

Zone: over lamp EE200473-2		Measurement position		T4		T5		T6	
Wavelength range	At 8 mm	W/m <sup>2</sup>	U(W/m <sup>2</sup> )	W/m <sup>2</sup>	U(W/m <sup>2</sup> )	W/m <sup>2</sup>	U(W/m <sup>2</sup> )		
UVC [200-280] nm		52	12	87	19	53	13		
UVC [250-256] nm		52	12	86	19	53	13		
<b>253.6 nm</b>		42.4	3.6	65.7	5.6	42.9	3.7		

Zone: next to lamp EE200473-2		Measurement position		L4		L5		L6	
Wavelength range	At 45 mm	W/m <sup>2</sup>	U(W/m <sup>2</sup> )	W/m <sup>2</sup>	U(W/m <sup>2</sup> )	W/m <sup>2</sup>	U(W/m <sup>2</sup> )		
UVC [200-280] nm		26.2	6.3	44	10	29.1	7.0		
UVC [250-256] nm		26.1	6.3	44	10	29.0	7.0		
<b>253.6 nm</b>		21.3	1.8	35.0	3.0	23.7	3.5		

The dose has been calculated for an exposure time of 0.55 s. Below is the table of the doses calculated in the different zones and their expanded uncertainties <sup>[1]</sup>.

Zone: driver		DOSE					
Measurement position		D1		D2		D3	
Wavelength range	Over driver	J/m <sup>2</sup>	U(J/m <sup>2</sup> )	J/m <sup>2</sup>	U(J/m <sup>2</sup> )	J/m <sup>2</sup>	U(J/m <sup>2</sup> )
UVC [200-280] nm		2.23	0.52	2.99	0.71	2.30	0.54
UVC [250-256] nm		2.19	0.52	2.95	0.71	2.24	0.54
<b>253.6 nm</b>		1.78	0.15	2.40	0.21	1.82	0.16



		DOSE					
		Measurement position	T1		T2		T3
Wavelength range	At 8 mm	J/m <sup>2</sup>	U(J/m <sup>2</sup> )	J/m <sup>2</sup>	U(J/m <sup>2</sup> )	J/m <sup>2</sup>	U(J/m <sup>2</sup> )
UVC [200-280] nm		31.9	7.5	47	11	35.0	8.2
UVC [250-256] nm		31.8	7.5	47	11	34.6	8.2
<b>253.6 nm</b>		25.6	2.2	35.9	3.1	27.8	2.4

		DOSE					
		Measurement position	L1		L2		L3
Wavelength range	At 45 mm	J/m <sup>2</sup>	U(J/m <sup>2</sup> )	J/m <sup>2</sup>	U(J/m <sup>2</sup> )	J/m <sup>2</sup>	U(J/m <sup>2</sup> )
UVC [200-280] nm		13.3	3.2	24.1	5.7	12.4	3.0
UVC [250-256] nm		13.3	3.2	24.0	5.7	12.4	3.0
<b>253.6 nm</b>		10.78	0.92	19.2	1.6	10.09	0.86

		DOSE					
		Measurement position	T4		T5		T6
Wavelength range	At 8 mm	J/m <sup>2</sup>	U(J/m <sup>2</sup> )	J/m <sup>2</sup>	U(J/m <sup>2</sup> )	J/m <sup>2</sup>	U(J/m <sup>2</sup> )
UVC [200-280] nm		28.8	6.9	48	11	29.0	6.9
UVC [250-256] nm		28.7	6.9	48	11	29.0	6.9
<b>253.6 nm</b>		23.3	2.0	36.1	3.1	23.6	2.0

Zone: next to lamp EE200473-2		DOSE					
		Measurement position	L4		L5		L6
Wavelength range	At 45 mm	J/m <sup>2</sup>	U(J/m <sup>2</sup> )	J/m <sup>2</sup>	U(J/m <sup>2</sup> )	J/m <sup>2</sup>	U(J/m <sup>2</sup> )
UVC [200-280] nm		14.4	3.4	24.1	5.7	16.0	3.9
UVC [250-256] nm		14.4	3.4	24.0	5.7	16.0	3.9
<b>253.6 nm</b>		11.7	1.0	19.3	1.6	13.0	1.9

**NOTE: This report is a translation of the original IE200309 report in Spanish**

<sup>[i]</sup> All the expanded uncertainties that appear in this test report have been calculated with a coverage factor k=2 (which, for a normal distribution, defines a level of confidence of approximately 95%)