

**Test report n. R-14 ELDO 2022**

**Ozone emission test report of  
REFINEAIR air purifier  
models Little Camp Plus, Little camp Basic**

Lesmo, February 25, 2022

Tested by: G.L. Porcu

By order of RefineAir Srl

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## 1 INTRODUCTION

This report describes the test results of the ozone emission of the air purifiers **REFINEAIR** models **Little Camp Plus** with the following electrical ratings: 230 V, 50 Hz, 42 W. The model **Little Camp Plus** (described below and in the pictures attached) was tested and considered representative also for the other model. As declared by the manufacturer the other model **Little Camp Basic** differs from the original one only for the absence on the ion generator.

The appliance was provided with a motor by **VENTS** type **VENTS 125 VKO1k L** and a dust free active sanitation system by **AIR CONTROL** type **FC Unit 3" DF09960** and an ion generator by **AIR CONTROL** type **Ionizzatore Bipolare**. This unit is mainly composed by a new dedicated UV-C lamp declared ozone-free (see annex 1) supplied through a dedicated driver and a  $\text{TiO}_2$  catalyst structure through which a photocatalytic oxidation is produced. Moreover, an electronic circuit was provided to supply the ion generator and regulate the speed fan (minimum speed 1020 rpm).

Tests were performed according to: EN 60335-2-65: 2003, A1:08, A11:12  
Household and similar electrical appliances  
Safety - Part 2-65: Particular requirements for air-cleaning appliances.

The procedure is described as follows:

### 32 Radiation, toxicity and similar hazards

*Replace the existing text by the following:*

This clause of Part 1 is replaced by the following.

**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 × 3,5 m × 3,0 m, the walls being covered with polyethylene sheet. If the instructions state that the appliance is to be fixed in a room having a volume exceeding 30 m<sup>3</sup>, the dimensions of the test room are increased accordingly.*

*The appliance is positioned in accordance with the instructions. Appliances used on a table are placed in the centre of the room approximately 750 mm above the floor.*

*The room is maintained at approximately 25 °C and 50 % relative humidity. The appliance is supplied at **rated voltage** for 24 h, removable filters being removed if this is more unfavourable.*

*The ozone sampling tube is to be located in the air stream 50 mm from the air outlet of the appliance. The background ozone concentration measured prior to the test is subtracted from the maximum concentration measured during the test.*

*The percentage of ozone in the room shall not exceed  $5 \times 10^{-6}$ .*

The measurement uncertainty stated in this document has been determined according to our PT01 procedure and has been estimated as expanded uncertainty obtained multiplying the standard uncertainty by the coverage factor  $K=2$  corresponding to a confidence level of about 95%; the conformity declared in this document, in the measurement carried out it also considers uncertainty.

Sampling was performed by the manufacturer and the test result presented in this report relates only to the object tested.

## 2 DEVICE UNDER TEST

Device under test : REFINEAIR air purifier mod. LITTLE CAMP PLUS.

The test was performed with the appliance positioned on the table with the instrument sampler near the outlet airflow (front side of the appliance - see pictures).

Client : RefineAir Srl

Test engineer : G.L. Porcu

Date of test : February 23 and 24, 2022

## 3 TEST RESULTS

### 3.1 Test set-up

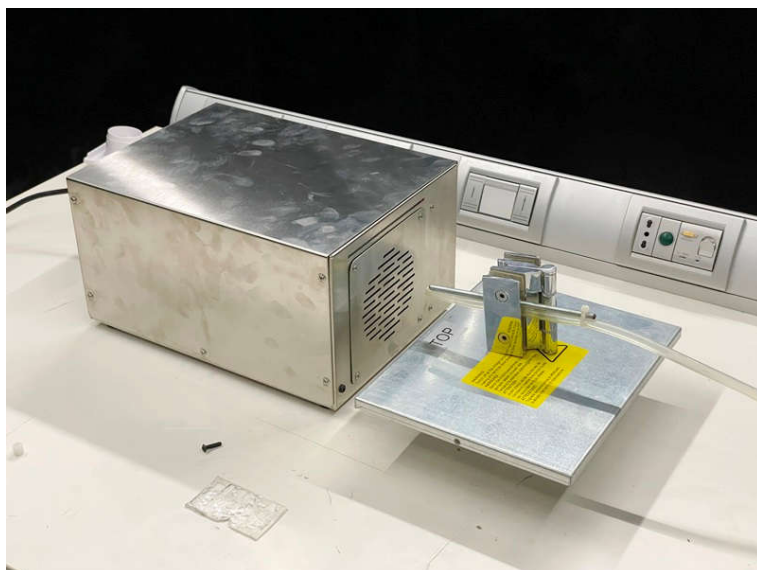
The test was performed in a test room with polyethylene walls (2,5m x 3,5m x 3,0m). The ozone emission in the test room was measured continuously with a UV photometric ozone analyzer (Environment S.A. Ozone Analyzer Model O342M SN.1404, LAT calibration certificate n.T144).

The measurement uncertainty of the ozone concentration in the range 0-100 ppb was 3 ppb.

The background ozone concentration measured prior to the test was subtracted from the measured ozone concentration during the test. The air was sampled continuously via a Teflon tubing located at 50 mm from the outlet airflow (worst position verified) towards the analyzer. See below for pictures of the test set-up.



Test room



Device under test  
Position of sampler  
during measurement.



Device under test  
Position of sampler  
during measurement.

### 3.2 Measurement

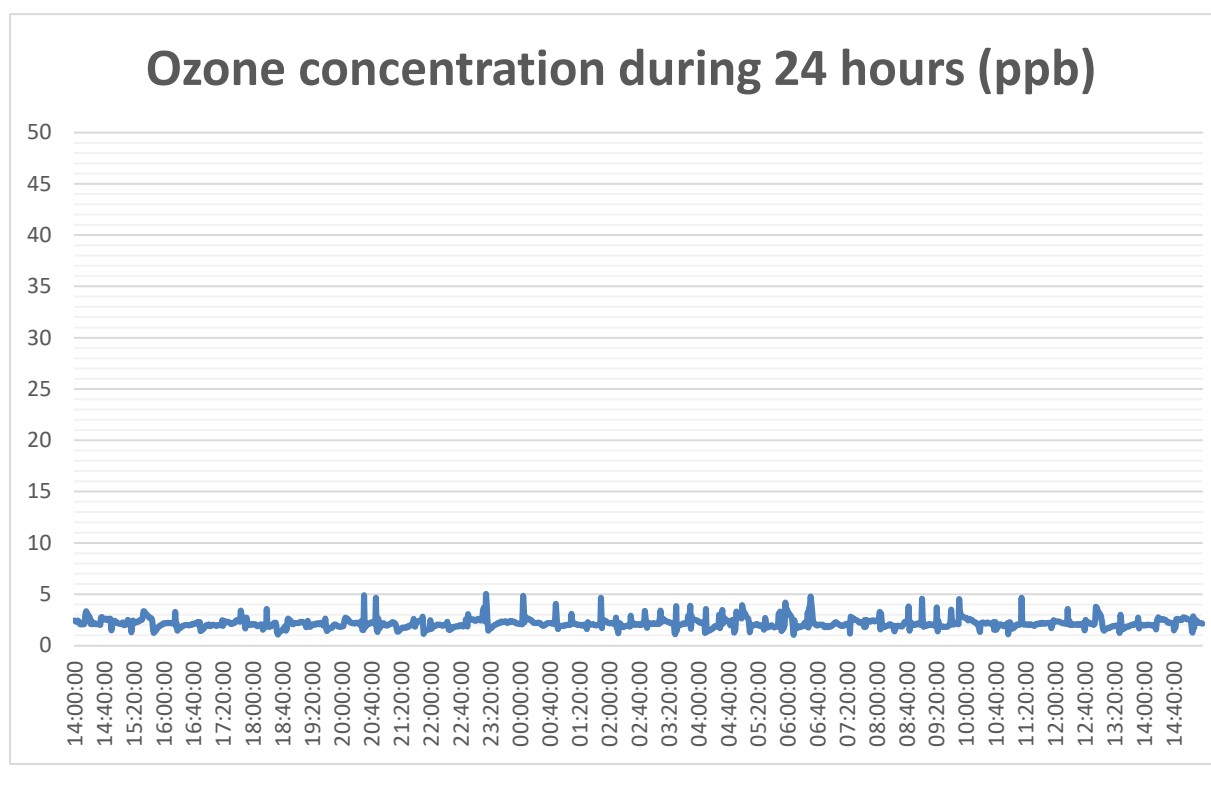
The test was performed on February 23 to 24, 2021 during about a 24h test time (from February 23, 2021 14:00 to February 24, 2021 14:00).

The appliance was provided with the mains switch to turn on and off the appliance and the speed motor fan knob to the minimum value.

Ozone emission during 24 hours after the start of the air purifier.

Max value = 5.1 ppb

Background ozone concentration = 2.2 ppb



## 4 CONCLUSION

The test sample documented in this report was tested according to the standard referenced in this report and was found **in compliance** with its requirements.

**The percentage of ozone in the test room has not exceeded  $5 \times 10^{-6}$  (50 ppb).**

**The maximum concentration reached, with the background value subtracted, was 2.9 ppb.**

## 5 Annex 1 – FC Unit and germicidal lamp data sheets



Tecnologie per il controllo dell'aria





3"





DF09960

Maximum Airflow

**800** m<sup>3</sup>/h

### DESCRIPTION OF PCO™ TECHNOLOGY

The **PCO™ technology** of Micropure modules take advantage of the combined action of rays of a **special UV lamp** with a catalyst structure made of a honeycomb metal alloy, basically composed of **TiO<sub>2</sub> (titanium dioxide and other 4 noble metals** in lower quantity.

The Micropure modules, hit by airflow, give rise to a photochemical reaction that produce hydroxyl radicals (•OH) and hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) in small quantities – below 0,02 PPM. H<sub>2</sub>O<sub>2</sub> e •OH allow the sanitization of both the airflow and of the ducts surfaces thanks to the high decomposition efficacy of pathogens.

**Effective against bacteria, viruses, molds, allergens, odors, organic and volatile compounds.**

### APPLICATION AREAS

- ▶ RESIDENZIAL
- ▶ TERTIARY

### INSTALLATION METHODS


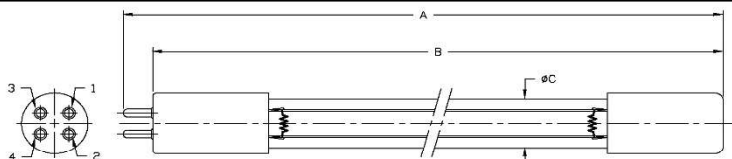
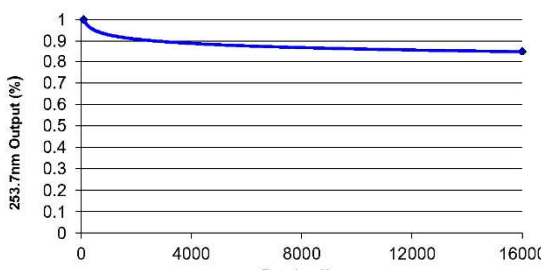
- ▶ On board of FANCOIL unit
- ▶ In HVAC systems
- ▶ In air delivery or connection plenum

• UV lamp replacement every two years

### TECHNICAL SPECIFICATIONS

Module dimensions	12,6 x 7,9 x 5 cm
Transformer dimension:	7,8 x 3,7 x 2,6 cm
Weight	0,45 Kg
Electrical characteristics	230 V - 50/60 Hz
Electrical current intensity	0,15 A
Max working temperature	60° C



 <b>DUST FREE®</b> <i>Breathe The Difference.</i>	Germicidal Lamp Data Sheet LOW CURRENT 170	DustFree LLP 1112 Industrial Dr Royse City, TX 75189												
Dust Free p/n 215990-10 NO OZONE														
<b>Dimensions:</b> A - Base face to opposite pin length B - Base face to base face length C - Diameter		125 mm 118 mm 15.0 mm												
														
<b>Electrical Data</b> (nominal values)  Lamp Wattage Lamp Current Lamp Voltage		3.5 W 170 mA 21 V												
<b>Physical Data</b> (nominal values)  UV Output 253.7nm (100hr) Intensity @ 1 meter Rated Average Life		0.7 W 7 μW/cm2 16000 hrs												
<div><div><b>Maintenance curve</b> The useful life is determined on the operation condition of the lamp (for example type of ballast, ignitor used, cooling conditions, on/off cycle, etc.)</div><div><div>Long Life +</div><table><caption>Maintenance Curve Data (Estimated)</caption><thead><tr><th>Burning Hours</th><th>253.7nm Output (%)</th></tr></thead><tbody><tr><td>0</td><td>1.00</td></tr><tr><td>4000</td><td>0.95</td></tr><tr><td>8000</td><td>0.90</td></tr><tr><td>12000</td><td>0.88</td></tr><tr><td>16000</td><td>0.85</td></tr></tbody></table></div></div>			Burning Hours	253.7nm Output (%)	0	1.00	4000	0.95	8000	0.90	12000	0.88	16000	0.85
Burning Hours	253.7nm Output (%)													
0	1.00													
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16000	0.85													
Note: Performance data are valid under laboratory conditions using <b>HIGH FREQUENCY ELECTRONIC BALLAST</b> .														

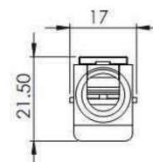
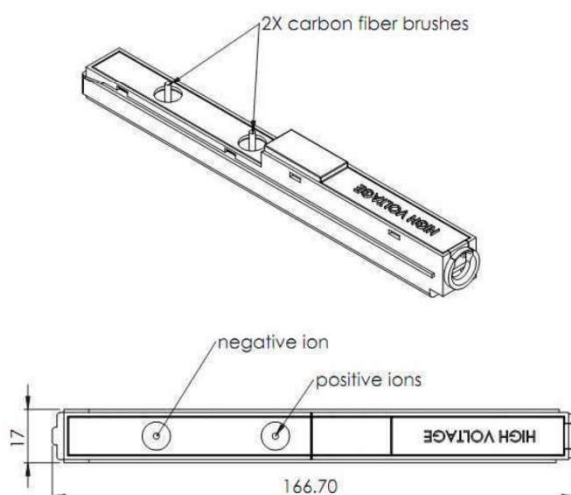


## 6 Annex 2 – Ion generator



### IONIZZATORE BIPOLARE

#### ❖ SCHEDA TECNICA PRODOTTO



#### Specifiche tecniche:

Power Input 2.1 mm x 9.5 mm

- ❖ 24 VAC nominali
- ❖ 18 VAC minimo
- ❖ 30 VAC massimo

Output:

- ❖ 3.5 KV +/- 5KV
- ❖ Spazzole in fibra di carbonio

Materiale alloggiamento:

- ❖ Plastica stampata ad iniezione
- ❖ V0 ABS, nero

**7 Annex 3 – Pictures of RefineAir mod. Little Camp Plus**

