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Łódź, 22-08-2016

Certificate of Analysis No K/313/02/2016

Subject of analysis: Flow bactericidal lamp series NBVE 60 N/S/P equipped with OSRAM light tubes

**Customer: Ultra-Viol sp.j. Pietras, Purgał, Wójcik
ul. Stępowizna 34
95-100 Zgierz**

The sample for testing was delivered by the Customer: 12-07-2016
The tests began: 13-07-2016
The tests finished: 30-07-2016

Type of analysis	Method	Results
Microbiological parameters		
Research of the air disinfection effectiveness	Own Methodology Instruction MAS-100 Eco™	The reduction of microorganisms
- the total number of microorganisms after 2 hours		R _{2h} = 48%
- the total number of microorganisms after 6 hours		R _{6h} = 71%
- the total number of microorganisms after 20 hours		R _{20h} = 99%
- the number of molds and yeast after 2 hours		R _{2h} = 3,4%
- the number of molds and yeast after 6 hours		R _{6h} = 13%
- the number of molds and yeast after 20 hours		R _{20h} = 90%

Authorized:

KIEROWNIK
Pracowni Mikrobiologii
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Accepted:

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Assessment of antibacterial efficacy of flow bactericidal lamp series NBVE 60 N/S/P equipped with OSRAM light tubes

The aim and scope of the research

The aim of the study was to determine the effectiveness of air disinfection by flow bactericidal lamp series NBVE 60 N/S/P equipped with OSRAM light tubes (Research report K /313/02/2016) on the basis of examination the total number of microorganisms and the number of mold and yeast using aspiration method after 2, 6 and 20 hours lamp working in a room with an area of 24 m².

Test procedure

The research was conducted in accordance with its own methodology developed at the Laboratory and the manufacturer's instructions MAS-100 ECOTM (Microbiological Air Sampler).

Bactericidal lamp was set next to the wall in the office room with an area of 24 m², in which, during the first 8 hours of experience, on average, every half an hour moved 1-2 people. Over the next 12 hours there were no people in the room. Measure the degree of air pollution was carried out in three points: on the opposite side of the lamp at a distance of 5 m, and in the corners of approx. 7 meters. The total count of microorganisms and the number of molds and yeasts was determined in the air before switching on the lamp. Then the lamp was turned on and the same research were done after 2, 6 and 20 hours of operation. The study was performed with sampling by aspiration method using a microbial air sampler MAS-100 ECOTM. Each time the device was placed on a flat surface, at a height of approx. 45 cm from the floor, facing the outlet up and sucked the 200 (control) or 1000 liters of air (time suck approx. 8 minutes), by a perforated plate. The air stream containing the particles was directed to the agar surface PCA or YGC in a standard Petri dish. After completing the sampling, plates were incubated at an appropriate temperature (30°C for 72 h or 25°C for 5 days). Then grown colonies were counted and the number of microorganisms was determined in a 1 m³ of air, having a statistical correction to the Feller conversion table. The percentage reduction in the number of microorganisms was calculated according to the formula 1.

$$(1) R = 100 - (b \times 100/k)$$

were:

R – reduction in the number of microorganisms

b – the number of microorganisms on the tests plates after operation of the lamp

k – the number of microorganisms on the control plates before operation of the lamp



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Table 1. The effectiveness of air disinfection by **Flow bactericidal lamp series NBVE 60 N/S/P equipped with OSRAM light tubes**

Operating time of the lamp [h]	The total number of microorganisms						
	The center of the room		Right corner of the room		Left corner of the room		Reduction [%] (Average value for the whole room)
	The number of bacteria cfu/m ³	Reduction [%]	The number of bacteria cfu/m ³	Reduction [%]	The number of bacteria cfu/m ³	Reduction [%]	
0	2228	-	1895	-	2028	-	
2	1005	55	1043	45	1134	44	48
6	480	78	530	72	742	64	71
20	31	99	42	98	22	99	99

Operating time of the lamp [h]	The number of molds and yeast						
	The center of the room		Right corner of the room		Left corner of the room		Reduction [%] (Average value for the whole room)
	The number of fungi cfu/m ³	Reduction [%]	The number of fungi cfu/m ³	Reduction [%]	The number of fungi cfu/m ³	Reduction [%]	
0	1654	-	1516	-	1100	-	
2	1589	4,7	1480	2,4	1065	3,2	3,4
6	1376	17	1312	13	989	10	13
20	128	92	113	93	143	87	90



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Final result

Flow bactericidal lamp series NBVE 60 N/S/P equipped with OSRAM light tubes, operating in a room with an area of 24 m², in which the total number of microorganisms in the air averages 2050 cfu/ m³, causes a reduction that number by an average of 48% after 2 hours, 71% after 6 hours and 99% after 20 hours. In addition, the lamp reduces the initial number of mold and yeast (approximately 1423 cfu / m³) about 3.4% after two hours of operation, 13% after 6 hours of operation and 90% after 20 hours of operation.

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