



Fraunhofer

**TESTED[®]
DEVICE**

Philips Lighting
Cleanroom CR434B LED 48/840
Report No. PH 1802-1006

DUPLICATE

Statement of
Qualification

Particle Emission

Statement of Qualification

Customer
 Philips Lighting
 Rondwegzuid 85
 7102 JD Winterswijk
 The Netherlands

Component tested

Category: Cleanroom Facilities
 Subcategory: Lighting Systems
 Product name: Cleanroom CR434B LED 48/840 PSD W60L60
 (manufacturing date: 12/6/2017; article number: 910501978103)

Random sampling of particle emissions (airborne) at representative sites

Standards/Guidelines: ISO 14644-1, -14
 The norms stated generally refer to the version valid at the time of the tests.

Test devices: Optical particle counter:
 LasAir II 110 and LasAir III 110 with measuring ranges $\geq 0.1 \mu\text{m}$, $\geq 0.2 \mu\text{m}$,
 $\geq 0.3 \mu\text{m}$, $\geq 0.5 \mu\text{m}$, $\geq 1.0 \mu\text{m}$ and $\geq 5.0 \mu\text{m}$

Test environment parameters:

- Cleanroom Air Cleanliness Class (according to ISO 14644-1):..... ISO 1
- Airflow velocity:.....0.45 m/s
- Airflow pattern:..... vertical laminar flow
- Temperature:22 °C \pm 0.5 °C
- Relative humidity: 45 % \pm 5 %

Test procedure parameters:
 The ceiling system was subjected to stress as follows:

- Structure-borne noise: approx. 5 to 50 Hz
- Oscillation velocity (\emptyset):..... v = 2 $\mu\text{m/s}$
- Oscillation acceleration (\emptyset):..... a = 0.6 $\mu\text{m/s}^2$
- Oscillation of the system (\emptyset): s = 0.02 μm

Test result / Classification

When operated under the specified test conditions, the lighting system Cleanroom CR434B LED 48/840 PSD W60L60 is suitable for use in cleanrooms fulfilling the specifications of the following Air Cleanliness Class according to ISO 14644-1:

| Test parameter(s) | Air Cleanliness Class |
|--|-----------------------|
| Structure-borne noise = approx. 5 to 50 Hz | 1 |
| Overall result | 1 |

It should be noted that cleanrooms of Class 1 to 5 according to ISO 14644-1 have a higher filter occupancy, which may restrict the use of panel lighting systems. Cleanrooms with a horizontal displacement flow form an exception to this.

The test result may be affected by the surrounding ceiling system, in particular the material pairing between lights and ceiling frames, as well as other mounting accessories. Particle emission behavior should be reassessed in each assembly situation.

The measuring devices used for the qualification tests are calibrated at regular intervals; their results can be traced back to national and international standards. In cases where no national standards exist, the test procedure implemented complies with the technical regulations and norms applicable at the time of the test. The relevant documentation can be viewed on request at any time.

Detailed information and parameters of the test environment can be found in the Fraunhofer IPA test report.

Fraunhofer Institute for Manufacturing Engineering and Automation IPA

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on behalf of 
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