



valid until: February 6, 2031

Fraunhofer

TESTED[®] DEVICE

Ritterwand GmbH & Co. KG
CR luminaire TK/FK M600
Report No. RI 2603-1734

DUPLICATE

Statement of
Qualification

Single product
Particle Emission
in Cleanroom
(atmospheric)

Statement of Qualification · Single product

Customer
 Ritterwand GmbH & Co. KG
 Roesseweg 5-7
 71154 Nufringen
 Germany

Tested product

Category: Cleanroom Facilities

Subcategory: Lighting Systems

Product name: Cleanroom recessed luminaire TK/FK M600
 (manufacturing date: 4/15/2025; color: white (RAL 9010); dimensions: 600 x 600 mm; article number: 498600520); serial number: 498; revisability: from below (UR))

Random sampling of particle emissions (airborne) at representative sites in cleanroom under atmospheric conditions

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

Test equipment: 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
- Room temperature: $22^\circ\text{C} \pm 0.5^\circ\text{C}$
- Relative humidity: $45\% \pm 5\%$

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

- Structure-borne noise: approx. 50 Hz
- Oscillation velocity (\emptyset):..... $v = 0.7536 \text{ mm/s}$
- Oscillation acceleration (\emptyset):..... $a = 0.1357 \text{ m/s}^2$
- Deflection of the system (\emptyset):..... $s = 0.0942 \text{ mm}$

Test result / Classification

The Cleanroom recessed luminaire TK/FK M600 is suitable for use under the specified test parameters (room temperature: $22^\circ\text{C} \pm 0.5^\circ\text{C}$; relative humidity: $45\% \pm 5\%$) in cleanrooms of the following Air Cleanliness Class according to ISO 14644-1:

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

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.

Please note: Transport damages, incorrect installation, aging behavior, corrosion etc. can influence the test result.

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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Business unit Testing and Certification

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on behalf of 
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