

Fraunhofer

**TESTED[®]
DEVICE**

SG Armaturen AS
DiLED IV

Report No. SG 2303-1398

DUPLICATE

Statement of
Qualification

Product series
Particle Emission

| | |
|--|---|
| Customer | SG Produktion A/S Egestubben 16-26 5270 Odense N Denmark |
| Component tested | |
| Category: | Cleanroom Facilities |
| Subcategory: | Lighting Systems |
| Product name: | DiLED IV Tested Products: <ul style="list-style-type: none">• DiLED IV 599X599 C 40W 4100lm 4000K (manufacturing date: 12/15/2022)• DiLED IV 299X1199 40W 4100lm 4000K (manufacturing date: 6/30/2023) |
| 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 $\geq 0.1\text{ }\mu\text{m}$, $\geq 0.2\text{ }\mu\text{m}$, $\geq 0.3\text{ }\mu\text{m}$, $\geq 0.5\text{ }\mu\text{m}$, $\geq 1.0\text{ }\mu\text{m}$ and $\geq 5.0\text{ }\mu\text{m}$ <ul style="list-style-type: none">• Airnet 310 with measuring ranges $\geq 0.3\text{ }\mu\text{m}$, $\geq 0.5\text{ }\mu\text{m}$, $\geq 1.0\text{ }\mu\text{m}$ and |
| Test environment parameters: | <ul style="list-style-type: none">• 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 luminaires were subjected to stress as follows: <ul style="list-style-type: none">• Structure-borne noise: approx. 50 Hz |

Test result / Classification

When operated under the specified test conditions, the luminaire series DiLED IV is suitable for use in cleanrooms fulfilling the specifications of the following Air Cleanliness Class according to ISO 14644-1:

| Test parameter(s) | Air Cleanlines 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.

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| Fraunhofer Institute for Manufacturing Engineering and Automation IPA | SG 2303-1398 Report No. first document | Stuttgart, November 16, 2023 Place, date of first document issued |
| Department of Ultraclean Technology and Micromanufacturing | -- Report No. current document | -- Place, current date |
| Nobelstrasse 12 70569 Stuttgart Germany | on behalf of Dr.-Ing. Frank Bürger, Project Manager Fraunhofer IPA |  |