valid until: February 3, 2030

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TESTED®
DEVICE

igus GmbH
E14.4.100.0
Report No. IG 2411-1575

Statement of
Qualification

Single product
Particle Emission
in Dry-Cleanroom
with Pre-aging

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Statement of Qualification · Single product

Customer

igus GmbH
Spicher Strasse 1a
51147 Cologne
Germany

Tested product

Category: Energy Supply

Subcategory: Cable Guiding Systems

Product name: E14.4.100.0 of the e-chain series E14
(manufacturing date: 10/9/2023; color: black; article number: E14.4.100.0;
serial number: E14; batch number: 70957617)

Random particle emission measurements (airborne) at representative points of the product in the dry-cleanroom with Pre-aging under dry room conditions

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 ≥ 0.1 µm, ≥ 0.2 µm, ≥ 0.3 µm, ≥ 0.5 µm, ≥ 1.0 µm and ≥ 5.0 µm

Test environment parameters:

- Dry-Cleanroom Air Cleanliness Class (according to ISO 14644-1): ..... ISO 3
- Airflow velocity: ..... 0.1 m/s ± 0.05 m/s
- Airflow pattern: ..... displacement flow
- Room temperature: ..... 22 °C ± 1 °C
- Relative humidity/dew point: ..... -40 °C ± 2 °C

Test procedure parameters:

- Pre-aging in dry room:
  – Insertion in dry room: ..... 1/31/2024; 7:10 am
  – Operation time in dry room: ..... 10 months
  – Cycles during operation time: 15.102.956
- Bending radius: ..... r = 100 mm
- Stroke length: ..... h = 750 mm
- Parameter set 1: ..... v_1 = 0.5 m/s; a_1 = 1.0 m/s²
- Parameter set 2: ..... v_2 = 1.0 m/s; a_2 = 2.0 m/s²
- Parameter set 3: ..... v_3 = 2.0 m/s; a_3 = 4.0 m/s²

Test result / Classification

When operated under the specified test conditions (room temperature of 22 °C ± 1 °C; dew point: -40 °C ± 2 °C), the E14.4.100.0 of the e-chain series E14 is suitable for use in dry-cleanrooms fulfilling the specifications of the following Air Cleanliness Classes according to ISO 14644-1:

Pre-aging, operation time in dry room: 10 months, 15.102.956 cycles	
Test parameter(s)	**Air Cleanlines Class**
v_1 = 0.5 m/s; a_1 = 1.0 m/s²	4
v_2 = 1.0 m/s; a_2 = 2.0 m/s²	4
v_3 = 2.0 m/s; a_3 = 4.0 m/s²	4
Overall result	**4**

Please note: Transport damages, incorrect installation, aging behavior 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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on behalf of
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