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TESTED®
DEVICE

igus GmbH
e-skin flat System
Report No. IG 2402-1498

Statement of
Qualification

Single product
Particle emission
in Dry-Cleanroom
Aging behavior

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Statement of Qualification · Single product

Customer

igus GmbH
Spicherstrasse 1a
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Germany

Tested product

Category: Energy Supply

Subcategory: Cable Guiding Systems

Product name: e-skin flat System
(manufacturing date: 10/2023; color: white; article number: e-skin flat System; serial number: SKF12C/SKF12O)

Random particle emission measurements (airborne) at representative points of the product in the dry-cleanroom during continuous operation to determine the aging behavior

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 ≥ 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:

- Continuous operation for determination of the aging behavior:
  - Measurement 1,new: ..... after running-in period 24 h, 0 cylces
  - Measurement 2, after 2 months: ..... 3,223,447 cycles
  - Measurement 3, after 4 months: ..... 5,071,531 cycles
  - Measurement 4, after 6 months: ..... 7,488,714 cycles
  - Measurement 5, after 8 months: ..... 10,017,858 cycles
  - Measurement 6, after 10 months: ..... 15,102,956 cycle
  - Measurement 7, after 12 months: ..... 20,086,109 cycle
- Bending radius and stroke length: ..... r = 240 mm; h = 750 mm
- Parameter set 1 to 3:
  - Velocity: ..... v_1 = 0.5 m/s
  - Acceleration: ..... a_1 = 1.0 m/s²
  - Velocity: ..... v_2 = 1.0 m/s
  - Acceleration: ..... a_2 = 2.0 m/s²
  - Velocity: ..... v_3 = 2.0 m/s
  - Acceleration: ..... a_3 = 4.0 m/s²

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Test result / Classification

When operated under the specified test conditions (room temperature of 22 °C ± 1 °C; dew point: -40 °C ± 2 °C), the cable guiding system e-skin flat System is suitable for use in dry-cleanrooms fulfilling the specifications of the following Air Cleanliness Classes according to ISO 14644-1:

Aging behavior during continuous operation in Dry-Cleanroom, Test parameter(s)	Air Cleanlines Class
Test 1, new (after running-in period, 0 cycles)	4
Test 2, after 2 months (3.2 Mio. cycles)	4
Test 3, after 4 months (5.1 Mio. cycles)	4
Test 4, after 6 months (7.5 Mio. cycles)	4
Test 5, after 8 months (10.0 Mio. cycles)	4
Test 6, after 10 months (15.1 Mio. cycles)	4
Test 7, after 12 months (20.1 Mio. cycles)	4
Overall result	**4**

Note 1: The results refer to the three test parameter sets: (0.5 m/s, 1.0 m/s²), (1.0 m/s, 2.0 m/s²), (2.0 m/s, 4.0 m/s²)

Note 2: 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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on behalf of
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