



Fraunhofer

**TESTED[®]
DEVICE**

igus GmbH
e-skin RBR (prototype)
Report No. IG 1504-755

DUPLICATE

Statement of
Qualification

Particle Emission

Statement of Qualification

Customer: igus GmbH
Spicher Straße 1A
51147 Cologne
Germany

Component tested

Category: Energy Supplies

Subcategory: Cable Guiding Systems

Product name: e-skin RBR (prototype)
(manufacturing date: 13/3/2015; color: white)

Test result / Classification:
(in acc. with ISO 14644-1)

When operated under the specified test conditions, the e-skin RBR (prototype) is suitable for use in cleanrooms fulfilling the specifications of the following air cleanliness classes:

Parameter	Air Cleanliness Class
$v_1 = 0.5 \text{ m/s}; a_1 = 1.0 \text{ m/s}^2$	1
$v_2 = 1.0 \text{ m/s}; a_2 = 2.0 \text{ m/s}^2$	1
$v_3 = 2.0 \text{ m/s}; a_3 = 4.0 \text{ m/s}^2$	1
Overall result	1

Random sampling of particle emissions (airborne) at representative sites

Standards/Guidelines: VDI 2083-9.1; ISO 14644-1
The norms stated refer to the relevant editions applicable at the time of the tests.

Test devices: Optical particle counter:
LasAir II 110/ 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:..... $22^\circ\text{C} \pm 0.5^\circ\text{C}$
- Relative humidity:..... $45\% \pm 5\%$

Test procedure parameters:

- Length:..... $l = 1140 \text{ mm}$
- Interior:..... empty
- Bending radius:..... $r = 200 \text{ mm}$
- Stroke length:..... $s = 820 \text{ mm}$
- Parameter set 1:..... $v_1 = 0.5 \text{ m/s}; a_1 = 1.0 \text{ m/s}^2$
- Parameter set 2:..... $v_2 = 1.0 \text{ m/s}; a_2 = 2.0 \text{ m/s}^2$
- Parameter set 3:..... $v_3 = 2.0 \text{ m/s}; a_3 = 4.0 \text{ m/s}^2$

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.

For further information about the test environment and parameters, please refer to the Fraunhofer IPA test report.

Fraunhofer Institute for
Manufacturing Engineering and Automation IPA

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Place, date of first document issued

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