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**TESTED[®]
DEVICE**

RK Rose+Krieger GmbH
RK DuoLine S60 Clean
Report No. RK 2011-1187

DUPLICATE

Statement of
Qualification

Single product
Particle Emission

Statement of Qualification · Single product

Customer
 RK Rose+Krieger GmbH
 Potsdamer Strasse 9
 32423 Minden
 Germany

Component tested

Category: Automation Components
 Subcategory: Linear Units
 Product name: RK DuoLine S60 Clean
 (manufacturing date: 6/2020; article number: TD16A5A1A13C01821;
 weight: 12.44 kg; range: 1500 mm)

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 $\geq 0.1 \mu\text{m}$, $\geq 0.2 \mu\text{m}$,
 $\geq 0.3 \mu\text{m}$, $\geq 0.5 \mu\text{m}$, $\geq 1.0 \mu\text{m}$ 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 °C \pm 0.5 °C
- Relative humidity: 45 % \pm 5 %

Test procedure parameters:

- Installation position: vertical, power unit beneath
- Travel length:..... s = 1420 mm
- Payload: none
- Suction:..... none
 - Velocities: $v_1 = 0.1 \text{ m/s}$; $v_2 = 0.25 \text{ m/s}$; $v_3 = 0.5 \text{ m/s}$
 - Acceleration (consistent): a = 4.0 m/s²
- Suction: Q = ~ 75 l/min
 - Velocities: $v_4 = 0.1 \text{ m/s}$; $v_5 = 0.25 \text{ m/s}$; $v_6 = 0.5 \text{ m/s}$
 - Acceleration (consistent): a = 4.0 m/s²

Test result / Classification

When operated under the specified test conditions, the linear axis RK DuoLine S60 Clean is suitable for use in cleanrooms fulfilling the specifications of the following Air Cleanliness Classes according to ISO 14644-1:

Test parameter(s)	Air Cleanliness Class
$v_1 = 0.1 \text{ m/s}$; $a_1 = 4.0 \text{ m/s}^2$; without suction	5
$v_2 = 0.25 \text{ m/s}$; $a_2 = 4.0 \text{ m/s}^2$; without suction	7
$v_3 = 0.5 \text{ m/s}$; $a_3 = 4.0 \text{ m/s}^2$; without suction	7
Overall result without suction	7
$v_4 = 0.1 \text{ m/s}$; $a_4 = 4.0 \text{ m/s}^2$; with suction	1
$v_5 = 0.25 \text{ m/s}$; $a_5 = 4.0 \text{ m/s}^2$; with suction	2
$v_6 = 0.5 \text{ m/s}$; $a_6 = 4.0 \text{ m/s}^2$; with suction	2
Overall result with suction	2

Please note: Transport damages, incorrect installation, oil leakage, 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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Department of Ultraclean Technology and Micromanufacturing

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