



**Fraunhofer**

**TESTED<sup>®</sup>  
DEVICE**

RK Rose+Krieger GmbH  
RK DuoLine S80 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 S80 Clean  
 (manufacturing date: 6/2020; article number: TD16A2A1A11C02370;  
 weight: 25.94 kg; range: 2000 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 = 1920 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/s<sup>2</sup>
- 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/s<sup>2</sup>

## Test result / Classification

When operated under the specified test conditions, the linear axis RK DuoLine S80 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	6
$v_2 = 0.25 \text{ m/s}$ ; $a_2 = 4.0 \text{ m/s}^2$ ; without suction	7
$v_3 = 0.5 \text{ m/s}$ ; $a_3 = 4.0 \text{ m/s}^2$ ; without suction	8
<b>Overall result without suction</b>	<b>8</b>
$v_4 = 0.1 \text{ m/s}$ ; $a_4 = 4.0 \text{ m/s}^2$ ; with suction	1
$v_5 = 0.25 \text{ m/s}$ ; $a_5 = 4.0 \text{ m/s}^2$ ; with suction	1
$v_6 = 0.5 \text{ m/s}$ ; $a_6 = 4.0 \text{ m/s}^2$ ; with suction	1
<b>Overall result with suction</b>	<b>1</b>

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

RK 1404-704  
 Report No. first document

Stuttgart, March 4, 2015  
 Place, date of first document issued

Department of Ultraclean Technology and Micromanufacturing

RK 2011-1187  
 Report No. current document

Stuttgart, February 26, 2021  
 Place, current date

Nobelstrasse 12  
 70569 Stuttgart  
 Germany

on behalf of   
 Dr.-Ing. Frank Bürger, Project Manager Fraunhofer IPA