



**Fraunhofer**

**TESTED<sup>®</sup>  
DEVICE**

montratec GmbH  
montrac single-axle MSH4 CR  
**Report No. MO 1706-920**

DUPLICATE

Statement of  
Qualification

Particle Emission

# Statement of Qualification

**Customer**  
 montratec GmbH  
 Johann-Liesenberger-Strasse 7  
 78078 Niedereschach  
 Germany

**Component tested**

Category: Automation Components  
 Subcategory: Transfer Systems and Bearing  
 Product name: montrac single-axle MSH4 CR  
 (manufacturing date: 6/21/2017; color: RAL 9006 silk matt white aluminum;  
 serial number: 2080364.001)

## 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:

- Load capacity: ..... m = 14.6 kg
- Shuttle route: ..... smaller inner loop
- Velocity on straight sections: .....  $v_1 = 30.0 \text{ m/min}$
- Velocity on curved sections: .....  $v_2 = 12.0 \text{ m/min}$

## Test result / Classification

When operated under the specified test conditions, the montrac single-axle MSH4 CR is suitable for use in cleanrooms fulfilling the specifications of the following Air Cleanliness Class according to ISO 14644-1:

Test parameter(s)	Air Cleanliness Class
$v_1 = 30.0 \text{ m/min}$ ; $v_2 = 12.0 \text{ m/min}$ ; $m = 14.6 \text{ kg}$	7
<b>Overall result</b>	<b>7</b>

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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