



**Fraunhofer**

**TESTED<sup>®</sup>  
DEVICE**

J. Schmalz GmbH  
SWGm-6S 146x146x65  
**Report No. SC 1606-831**

DUPLICATE

Statement of  
Qualification

Particle Emission

# Statement of Qualification

**Customer**  
 J. Schmalz GmbH  
 Aacher Strasse 29  
 72293 Glatten  
 Germany

**Component tested**

Category: Process Equipment  
 Subcategory: Vacuum Components  
 Product name: Wafer gripper SWGm-6S 146x146x65  
 (material code: PEEK; article number: 10.01.30.00138;  
 material type: assembly with PEEK suction surface)

## Random sampling of particle emissions (airborne) at representative sites

Standards/Guidelines: VDI 2083-9.1; ISO 14644-1  
 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:

- Operating pressure: ..... 6 bar (ultra-pure compressed air)
- Static absolute pressure on the gripper: ..... approx. 200 mbar
- Evacuation time:..... 12 s
- Release time: ..... 8 s
- Cycles per minute:..... 3

## Test result / Classification

When operated under the specified test conditions, the wafer gripper SWGm-6S 146x146x65 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
operating pressure = 6 bar (ultra-pure compressed air) evacuation time = 12 s release time = 8 s cycles per minute = 3	1
<b>Overall result</b>	<b>1</b>

The concentration of particles in the handling area of the gripper is directly dependent on the quality of the compressed air and the pneumatic components used to operate the ejectors. In order to handle cleanliness-sensitive products and to maintain the integrity of the surrounding cleanroom, venting of compressed air into the handling area of the gripper must be avoided.

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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Stuttgart, October 10, 2016

Place, date of first document issued

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Place, current date

on behalf of   
 Frank Bürger, Project Manager Fraunhofer IPA