



valid until: May 13, 2031

# Fraunhofer

## TESTED<sup>®</sup> DEVICE

PFENNIG Reinigungstechnik GmbH  
Elis Cleanflow

**Report No. PF 2509-1668**

DUPLICATE

Statement of  
Qualification

Single product  
Particle Emission  
in Cleanroom  
(atmospheric)

# Statement of Qualification · Single product

**Customer** PFENNIG Reinigungstechnik GmbH  
Heubachstrasse 1  
87471 Durach  
Germany

**Tested product**

Category: Working Place and Operator

Subcategory: Work Equipement

Product name: Elis Cleanflow  
(manufacturing date: 6/25/2025; color: gray, dark blue stripes; material: 100 % Polyester (76 % recycled); pre-treatment: pre-washed; article number: 3500142)

## Random sampling of particle emissions (airborne) in cleanroom under atmospheric conditions

Standards/guidelines: ISO 14644-1, -14; VDI 2083 Part 9.2, Part 9.1 (without 24-hour running-in period)  
The norms stated generally refer to the version valid at the time of the tests.

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

Test procedure parameters: Test bench according to ISO 9073-10:

- Sample clamping position:..... flat
- Length between clamping points: ..... 230 mm
- Motion cycle:
  - Linear compression: ..... s = 120 mm
  - Torsion: .....  $180^\circ$
- Cycle time: ..... t = 1 s
- Sampling chamber:..... none
- Duration of stress applied to test piece: ..... 100 min
- Distance between particle counting probe and test piece:..... 130 mm

## Test result / Classification

The mop Elis Cleanflow in dry state is suitable for use under the specified test parameters (room temperature:  $22 \text{ }^\circ\text{C} \pm 0.5 \text{ }^\circ\text{C}$ ; relative humidity:  $45 \% \pm 5 \%$ ) in cleanrooms of the following Air Cleanliness Class according to ISO 14644-1:

Test parameter(s)	Air Cleanlines Class
Linear compression = 120 mm Torsion = $180^\circ$ Cycle time t = 1 s	<b>6</b>
<b>Overall result</b>	

This corresponds with ISO-ACP<sub>c</sub> Class 6 according to VDI 2083 Part 9.2.

Please note: Transport damages, incorrect installation, aging behavior 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.

Fraunhofer Institute for Manufacturing Engineering and Automation IPA

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Business unit Testing and Certification

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Report No. current document

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Place, current date

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on behalf of   
Dr.-Ing. Frank Bürger, head of business unit Testing and Certification