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TESTED[®]
DEVICE

Pfennig Reinigungstechnik GmbH
MicroMop Ultra CR/A
Report No. PF 2503-1605

DUPLICATE

Statement of
Qualification

Single product
Particle Emission
in Cleanroom
(atmospheric)

Customer	Pfennig Reinigungstechnik GmbH Heubachstrasse 1 87471 Durach Germany
Tested product	
Category:	Materials
Subcategory:	Consumables
Product name:	MicroMop Ultra CR/A (manufacturing date: 7/2024; color: blue-multicolored; material: polyester; pre-treatment: pre-washed; article number: 3500270)

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:	<ul style="list-style-type: none">Cleanroom Air Cleanliness Class (according to ISO 14644-1):..... ISO 1Airflow velocity:.....0.45 m/sAirflow pattern:..... vertical laminar flowRoom temperature:22 °C ± 0.5 °CRelative humidity: 45 % ± 5 %
Test procedure parameters:	Test bench according to ISO 9073-10: <ul style="list-style-type: none">Sample clamping position:..... flatLength between clamping points: 230 mmMotion cycle:<ul style="list-style-type: none">– Linear compression: s = 120 mm– Torsion: 180 °Cycle time: t = 1 sSampling chamber:.....noneDuration of stress applied to test piece: 100 minDistance between particle counting probe and test piece:..... 130 mm

Test result / Classification	The MicroMop Ultra CR/A (pre-washed) in dry state is suitable for use under the specified test parameters (room temperature: 22 °C ± 0.5 °C; relative humidity: 45 % ± 5 %) in cleanrooms of the following Air Cleanliness Class according to ISO 14644-1:
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Test parameter(s)	Air Cleanlines Class
Linear compression = 120 mm Torsion = 180 ° Cycle time t = 1 s	4
Overall result	

This corresponds with ISO-ACP_c Class 4 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.

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	Pf 2503-1605 Report No. first document	Stuttgart, April 30, 2025 Place, date of first document issued
Business unit Testing and Certification	-- Report No. current document	-- Place, current date
Nobelstrasse 12 70569 Stuttgart Germany	on behalf of Dr.-Ing. Frank Bürger, head of business unit Testing and Certification	