



valid until: December 12, 2030

Fraunhofer
TESTED[®]
DEVICE
DMG MORI Pfronten GmbH
AMR 1000
Report No. DM 2512-1697

DUPPLICATE

Statement of
Qualification

Single product
Particle Emission
in Cleanroom
(atmospheric)

Statement of Qualification • Single product

Customer

DMG MORI Pfronten GmbH
DECKEL MAHO-Strasse 1
87459 Pfronten
Germany

Tested product

Category: Automation Components
Subcategory: Robotics
Product name: Autonomous mobile robot AMR 1000
(manufacturing date: 9/2025; weight: 530kg; article number: 4352873;
serial number: 99326010)

Test result / Classification

The autonomous mobile robot AMR 1000 is suitable for use under the specified test parameters (room temperature: $22^{\circ}\text{C} \pm 0.5^{\circ}\text{C}$; relative humidity: $45\% \pm 5\%$) in cleanrooms of the following Air Cleanliness Classes according to ISO 14644-1:

Test parameter(s)	Air Cleanliness Class
Driving process	5
Lifting process	5
Charging process	4
Overall result	5

Please note: Transport damages, incorrect installation, oil leakage, aging behavior, corrosion etc. can influence the test result.

Random sampling of particle emissions (airborne) at representative sites in cleanroom under atmospheric conditions

Standards/guidelines: ISO 14644-1, -14
The norms stated generally refer to the version valid at the time of the tests.

Test equipment: 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
- Room temperature: $22^{\circ}\text{C} \pm 0.5^{\circ}\text{C}$
- Relative humidity: 45 % $\pm 5\%$

Test procedure parameters:

- Parameter Set 1 - Driving process:
 - Max. velocity: $v_{\text{max}} = 1666 \text{ mm/s}$
 - Max. linear acceleration: $a = 750 \text{ mm/s}^2$
 - Max. linear deceleration: $a = -750 \text{ mm/s}^2$
 - Max. angular velocity: $v_{\text{rot}} = 68.75 \text{ deg/s}$
 - Max. rotational acceleration/deceleration: $a_{\text{rot}} = 48.128 \text{ deg/s}^2$
 - Attached payload: $m = 1000 \text{ kg}$
- Parameter Set 2 - Lifting process:
 - Attached payload: $m = 1000 \text{ kg}$
 - Lifting/sinking speed: $v_s = 29.1666 \text{ mm/s}$
 - Lifting/sinking stroke: $s_s = 75 \text{ mm}$
 - No. of cycles of lifting in a minute: $n_s = \text{ca. 20 max.}$
- Parameter Set 3 - Charging process:
 - Active loading time: $t_l = 92 \text{ min}$
 - Fan air flow rate: $Q_f = 105 \text{ m}^3/\text{h}$

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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Stuttgart, December 12, 2025
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Business unit
Testing and Certification

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Report No. current document

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Place, current date

Nobelstrasse 12
70569 Stuttgart
Germany

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

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