



Fraunhofer

TESTED[®] DEVICE

POUL Group ApS
the fork (P-FORK-P1)
Report No. PO 2510-1679

DUPLICATE

Statement of
Qualification

Single product
Particle Emission
in Cleanroom
(atmospheric)

Statement of Qualification · Single product

Customer
 POUL Group ApS
 Ålandsgade 26, 4. mf.
 2300 Copenhagen
 Denmark

Tested product

Category: Automation Components
 Subcategory: Robotics
 Product name: the fork (P-FORK-P1)
 (manufacturing date: 8/15/2025; color: gray/blue; dimensions: 1650 x 900 x 700 mm; article number: P-FORK-P1)

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 without load:
 - Max. velocity: $v_{\text{max}} = 0.56 \text{ m/s}$
 - Max. linear acceleration: $a_{\text{max}} = 0.12 \text{ m/s}^2$
 - Max. angular velocity: $v_{\text{rot}} = 15 \text{ deg/s}$
- Parameter Set 3 - Lifting without load:
 - Lifting/sinking speed: $v_s = 6.2 \text{ mm/s}$
 - Lifting/sinking stroke: $s_s = 37 \text{ mm}$
 - No. of cycles of lifting in one hour: $n_s = 7$
- Parameter Set 5 - Charging process:
 - Active loading time: $t_l = 20 \text{ min}$

Test result / Classification

The fork (P-FORK-P1) 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
$v_{\text{max}} = 0.56 \text{ m/s}$; $a_{\text{max}} = 0.12 \text{ m/s}^2$ Driving without load	5
$v_s = 6.2 \text{ mm/s}$; $s_s = 37 \text{ mm}$ Lifting without load	5
Charging Behavior	5
Overall result	5

Please note: Transport damages, incorrect installation, oil leakage, aging behavior, corrosion 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

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Business unit Testing and Certification

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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