



valid until: January 14, 2031

# Fraunhofer

## TESTED<sup>®</sup> DEVICE

Bosch Rexroth AG  
TS 1 48V

**Report No. BO 2512-1695**

DUPLICATE

Statement of  
Qualification

Single product  
Particle Emission  
in Cleanroom  
(atmospheric)

# Statement of Qualification · Single product

**Customer**  
 Bosch Rexroth AG  
 Löwentorstrasse 74  
 70376 Stuttgart  
 Germany

**Tested product**

Category: Automation Components  
 Subcategory: Transfer Systems and Bearing  
 Product name: Transfer System TS 1 48V  
 (manufacturing date: 6/2025; color: silver; dimensions: 2500 x 750 x 1237 mm; serial number and parts: 1 x KU 1/180 (3842998986), 2 x BS 1/M-E (3842998980), 1 x EQ 1/TR-E (3842998983), 2 x BS 1-E (3842998979), 6 x Interfacemodul IO-LINK 3 (3842571282))

## 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: .....  $22 \text{ }^\circ\text{C} \pm 0.5 \text{ }^\circ\text{C}$
- Relative humidity: .....  $45 \% \pm 5 \%$

Test procedure parameters:

- Conveying length: .....  $l = 4306 \text{ mm}$
- Conveying width: .....  $w = 120 \text{ mm}$
- Conveying height: .....  $h = 900 \text{ mm}$
- Carrier medium: ..... Timing Belt PA66
- Payload: .....  $m = 0.5 \text{ kg}$
- Parameter Set 1:
  - Velocity BS + EQ: .....  $v_1 = 6 \text{ m/min}$
  - Velocity curve: .....  $v_2 = 18 \text{ m/min}$
  - Belt: ..... old
- Parameter Set 2:
  - Velocity BS + EQ: .....  $v_1 = 6 \text{ m/min}$
  - Velocity curve: .....  $v_1 = 6 \text{ m/min}$
  - Belt: ..... old
- Parameter Set 3:
  - Velocity BS + EQ: .....  $v_1 = 6 \text{ m/min}$
  - Velocity curve: .....  $v_1 = 6 \text{ m/min}$
  - Belt: ..... new

## Test result / Classification

The Transfer System TS 1 48V 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 Classes according to ISO 14644-1:

Test parameter(s)	Air Cleanliness Class
$v_1 = 6 \text{ m/min}$ (BS + EQ); $v_2 = 18 \text{ m/min}$ (curve) belt: old	6
$v_1 = 6 \text{ m/min}$ (BS + EQ); $v_1 = 6 \text{ m/min}$ (curve) belt: old	5
$v_1 = 6 \text{ m/min}$ (BS + EQ); $v_1 = 6 \text{ m/min}$ (curve) belt: new	6
<b>Overall result</b>	<b>6</b>

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