



Fraunhofer

**TESTED[®]
DEVICE**

Invenpro (M) Sdn. Bhd.
Conveyor INV-CRC-0800
Report No. IN 1311-678

DUPLICATE

Statement of
Qualification

Particle Emission

Statement of Qualification

Customer: Invenpro (M) Sdn. Bhd.
No. 43, Jalan Taming 5
Taman Taming Jaya
43300 Seri Kembangan
Selangor Darul Ehsan
Malaysia

Component tested

Category: Automation Components
Subcategory: Transfer Systems and Bearing
Type: Cleanroom conveyor INV-CRC-0800
(manufacturing date: 10/1/2013, material: stainless steel)

Random check measurements of particle emission (airborne) at representative points

Standards/Guidelines: VDI 2083-9.1; ISO 14644-1
Each standard stated refers to the version valid at the time of testing.

Measuring equipment: Optical particle counters:
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 parameters of test environment:

- Cleanroom fulfilling Air Cleanliness Class (i.a.w. ISO 14644-1): ISO 1
- Air flow velocity: 0.45 m/s
- Flow guidance: vertical unidirectional air flow
- Temperature: $22^\circ\text{C} \pm 0.5^\circ\text{C}$
- Relative humidity: $45\% \pm 5\%$

Test parameters of test execution:

- Mass of the cassette: 1019 g
- Conveying velocity: $v = 0.1 \text{ m/s}$

Test results / Classification:
(in accordance with ISO 14644-1)

The cleanroom conveyor INV-CRC-0800 is suitable for use in cleanrooms fulfilling the following the Air Cleanliness Class when carrying a filled cassette:

Parameter	Air Cleanliness Class
$v = 0.1 \text{ m/s}$	5

After completing the tests there was non airbourne abrasion from the cassette material clearly visible on the cassette itself and on the carrying wheels of the conveyor. This might be critical in cleanroom applications.

The measuring equipment used for the qualification is regularly calibrated and is based on national and international standards. In the case where no national standards exist, the measuring procedure used corresponds with technical regulations and norms valid at the time of the measurement. The documents drawn up for this procedure are available for viewing.

Please find detailed information about test environment and parameters in the report of Fraunhofer IPA.

Fraunhofer Institute for
Manufacturing Engineering and Automation IPA
Department for Ultraclean Technology
and Micromanufacturing

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Stuttgart, January 27, 2014

Place, Date of first issuance

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Place, Date of update

i. A. 
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