



**Fraunhofer**

**TESTED<sup>®</sup>  
DEVICE**

ELAU GmbH  
P4s(b)-x-CW-15-1200  
**Report No. EL 1004-519**

DUPLICATE

Statement of  
Qualification

# Statement of Qualification

**Customer:** ELAU GmbH  
Dillberg 12-16  
97828 Marktheidenfeld  
Germany

**Component tested:** PacDrive Robot

**Type:** P4s(b)-x-CW-15-1200

**Tests performed:** Random check measurements of particle emission (airborne) at representative points.

**Test parameters:** Robot running with following parameters:

- Trajectory:  
170 mm vertical up; 530 mm horizontal movement; 170 mm vertical down  
During a cycle the robot moves forth and back on the path so that at the end of the cycle the robot is back at the starting point.
- The cycle described above is executed to three (3) different positions in the workspace.
- Attached payload: 1.5 kg (nominal payload of the machine)
- Max. acceleration: 80 m/s<sup>2</sup> (nominal 75 m/s<sup>2</sup> at 1.5 kg payload)
- Max. velocity: 4.5 m/s
- Number of cycles: 84.5 picks per minute

**Test results / classification:** When the PacDrive Robot P4s(b)-x-CW-15-1200 is being operated at the above mentioned test parameters, it is suitable for use in cleanrooms fulfilling the Air Cleanliness Class 6 according to ISO 14644-1.

**Standards / guidelines used for the qualification:** VDI 2083 Part 1, 4 and 9.1; ISO 14644-1

**Test parameters of the cleanroom environment:** Cleanroom of Air Cleanliness Class ISO Class 1 (according to ISO 14644-1)

Air flow velocity: 0.45 m/s

Air flow guidance: vertical unidirectional air flow from ceiling to floor (raised floor)

Temperature: 22 °C ± 0.5 °C (71.6 °F ± 0.9 °F)

Relative humidity: 45 % ± 5 %

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.

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