



**Fraunhofer**

**TESTED<sup>®</sup>  
DEVICE**

FANUC Europe Corporation S.A.

M-20iB\25C

**Report No. FA 1705-911**

DUPLICATE

Statement of  
Qualification

Particle Emission

# Statement of Qualification

**Customer**  
 FANUC Europe Corporation S.A.  
 rue Benedikt Zender 7  
 6469 Echternach  
 Luxembourg

**Component tested**

Category: Automation Components  
 Subcategory: Robotics  
 Product name: M-20iB\25C in white paint/25kg standard cleanroom (A05B-1226-B221)  
 (manufacturing date: 9/2/2017; serial number: E-95294)

## Test result / Classification

When operated under the specified test conditions, the robot M-20iB\25C in white paint/25kg standard cleanroom (A05B-1226-B221) is suitable for use in cleanrooms fulfilling the specifications of the following Air Cleanliness Classes according to ISO 14644-1:

Test parameter(s)	Air Cleanliness Class
Velocity = 40 %	5
Velocity = 80 %	5
<b>Overall result</b>	<b>5</b>

## Random sampling of particle emissions (airborne) at representative sites

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

Test devices: 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  $> 5.0 \mu\text{m}$

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
- Temperature: .....22 °C  $\pm$  0.5 °C
- Relative humidity: ..... 45 %  $\pm$  5 %

Test procedure parameters:

- Velocity: ..... 40 % and 80 %
- Attached payload: ..... 25 kg
- Pause between cycles: .....5 s
- Operation of each axis:..... separately
- Movement of each axis:
  - Axis 1: .....170° until -170°
  - Axis 2: .....-75.58° until -83.706°
  - Axis 3: .....159.7° until -61.9°
  - Axis 4: .....-195° until 195°
  - Axis 5: .....95.4° until -97°
  - Axis 6: .....-270° until 270°

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.

For further information about the test environment and parameters, please refer to the Fraunhofer IPA test report.

Fraunhofer Institute for Manufacturing Engineering and Automation IPA

FA 1705-911  
 Report No. first document

Stuttgart, October 18, 2017  
 Place, date of first document issued

Department of Ultraclean Technology and Micromanufacturing

--  
 Report No. current document

--  
 Place, current date

Nobelstrasse 12  
 70569 Stuttgart  
 Germany

on behalf of   
 Dr.-Ing. Frank Bürger, Project Manager Fraunhofer IPA