



**Fraunhofer**

**TESTED<sup>®</sup>  
DEVICE**

KUKA Roboter GmbH  
KR AGILUS - 2 series  
**Report No. KU 1707-926**

DUPLICATE

Statement of  
Qualification

Electrostatic  
Charge Behavior

# Statement of Qualification

**Customer**  
 KUKA Roboter GmbH  
 Zugspitzstrasse 140  
 86165 Augsburg  
 Germany

**Component tested**

Category: Automation Components

Subcategory: Robotics

Product name: KR AGILUS - 2 series consisting of:

- KR6 R700-2 (manufacturing date: 7/2017; color: white; serial number: 1023004)
- KR10 R1100-2 (manufacturing date: 9/2017; color: white; serial number: 1023013)

## Measurement of the electrostatic field

Standards/Guidelines: SEMI E78-0309  
 The norms stated generally refer to the version valid at the time of the tests.

Test devices:

- Data capture:.....Influence-E-Fieldmeter, type EMF58  
 ..... Eltex-Elektrostatik-GmbH

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 ± 0.5 °C
- Relative humidity:..... 45 % ± 5 %

Test procedure parameters:

- Insulating mount:
  - Type:..... 4x hexagonal insulators with  $R > 10^{14} \Omega$
  - Material:..... polyester, glassfilled
  - Thickness:..... 35 mm
- Tool weight: ..... no tools mounted
- Motion sequence:.....typical pick & place sequence
- Position of each axis:
  - Axis 1: .....0° until 92.5°
  - Axis 2: ..... 90° until -39°
  - Axis 3: .....85° until 135°
  - Axis 4: .....0° until 9°
  - Axis 5: .....0° until 28°
  - Axis 6: ..... -55° until 2°
- Capacity: .....50 % of maximum capacity
- Operating state: ..... on

## Test result / Classification

The KR AGILUS - 2 series fulfills permissible limit values 100V/cm (10 kV/m) for the sensitivity threshold 2010/45 nm according to SEMI E78-0309.

Electrostatic Field				
Testpiece	Electrostatic Level		Test result	
	Year node	Limit value [V/cm]	Mean value [V/cm]	Max. single value measured [V/cm]
KR6 R700-2	2010 45 nm	50	39	84
			Limit value fulfilled	
KR10 R1100-2	2013 32 nm	35	26	68
			Limit value fulfilled	

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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Nobelstrasse 12  
 70569 Stuttgart  
 Germany

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