



Fraunhofer

**TESTED[®]
DEVICE**

DYDEN CORPORATION
RMFES (AWG 26 / 4P)
Report No. DY 1510-787

DUPLICATE

Statement of
Qualification

Particle Emission

Statement of Qualification

Customer
 DYDEN CORPORATION
 2-15-1 Minami
 830-8511 Kurume-shi, Fukuoka
 Japan

Component tested

Category: Energy Supply
 Subcategory: Cable System
 Product name: RMFES (AWG 26/4P)
 (manufacturing date: 9/2015; color: black; serial number: DY150925-02)

Test result / Classification

When operated under the specified test conditions, the cable system RMFES (AWG 26/4P) is suitable for use in cleanrooms fulfilling the specifications of the following Air Cleanliness Class according to ISO 14644-1:

Test parameters	Air Cleanliness Class
$v_1 = 0.5 \text{ m/s}; a_1 = 1.0 \text{ m/s}^2$	1
$v_2 = 1.0 \text{ m/s}; a_2 = 2.0 \text{ m/s}^2$	1
$v_3 = 2.0 \text{ m/s}; a_3 = 4.0 \text{ m/s}^2$	1
Overall result	1

Random sampling of particle emissions (airborne) at representative sites

Standards/Guidelines: VDI 2083-9.1; ISO 14644-1
 The stated norms are generally those that were applicable at the time the tests were conducted.

Test devices: Optical particle counter:
 LasAir II 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
- Temperature:22 °C \pm 0.5 °C
- Relative humidity: 45 % \pm 5 %

Test procedure parameters:

- Energy chain:igus E61.29.050.150.0
- Chain bending radius:r = 150 mm
- Stroke length:.....s = 820 mm
- Cable length:.....l = 1090 mm
- Parameter Set 1:..... $v_1 = 0.5 \text{ m/s}; a_1 = 1.0 \text{ m/s}^2$
- Parameter Set 2:..... $v_2 = 1.0 \text{ m/s}; a_2 = 2.0 \text{ m/s}^2$
- Parameter Set 3:..... $v_3 = 2.0 \text{ m/s}; a_3 = 4.0 \text{ m/s}^2$

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

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Place, date of first document issued

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Place, current date

on behalf of 
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