



Fraunhofer

TESTED[®]
DEVICE

NICHIGOH
RO-FLEX I II III S 4.0 x 10C
Report No. NI 2604-1766

DUPLICATE

Statement of
Qualification

Single product
Particle Emission
in Cleanroom
(atmospheric)

Customer	NICHIGOH COMMUNICATION ELECTRIC WIRE CO., LTD. 2175-1, Uenoyorozumachi 518-0855 Iga-City, Mie Japan
Tested product	
Category:	Energy Supply
Subcategory:	Cable Systems
Product name:	RO-FLEX I II III S 4.0 x 10C (manufacturing date: 11/2025; color: black; article number: ZZ-31414; batch number: 6672)

Random sampling of particle emissions (airborne) at representative sites in cleanroom under atmospheric conditions

Standards/guidelines:	ISO 14644-1, -14 The norms stated generally refer to the version valid at the time of the tests.
Test equipment:	Optical particle counter: LasAir II 110 and LasAir III 110 with measuring ranges $\geq 0.1\text{ }\mu\text{m}$, $\geq 0.2\text{ }\mu\text{m}$, $\geq 0.3\text{ }\mu\text{m}$, $\geq 0.5\text{ }\mu\text{m}$, $\geq 1.0\text{ }\mu\text{m}$ and $\geq 5.0\text{ }\mu\text{m}$
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 - Room temperature:22 °C ± 0.5 °C - Relative humidity: 45 % ± 5 %
Test procedure parameters:	- Energy chain: igus E61.29.02.150 - Bending radius:r = 150 mm - Stroke length: s = 820 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:.....$v_3 = 2.0\text{ m/s}$; $a_3 = 4.0\text{ m/s}^2$

Test result / Classification	The cable RO-FLEX I II III S 4.0 x 10C is suitable for use under the speci- fied test parameters (room temperature: 22 °C ± 0.5 °C; relative humidity: 45 % ± 5 %) in cleanrooms of the following Air Cleanliness Classes according to ISO 14644-1:
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Test parameter(s)	Air Cleanlines 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

Please note: Transport damages, incorrect installation, aging behavior, etc.
can influence the test result.

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.