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DEVICE

LEONI Kerpen GmbH
MegaLine D1-20 S/U 11Y superflex
Report No. LE 1212-626

DUPLICATE

Statement of
Qualification

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Statement of Qualification

Customer:

LEONI Kerpen GmbH
Zweifaller Str. 275 - 287
52224 Stolberg
Germany

Component tested:

Category: Energy Supply

Subcategory: Cable Systems

Type: MegaLine D1-20 S/U superflex 4P 11Y SPICE Code 10124

Random check measurements of particle emission (airborne) at representative points

Test procedure: According to VDI 2083-9.1
Each standard stated refers to the version valid at the time of testing.

Measuring instruments: Optical Particle Counter:
Model LasAir II 110 manufactured by PMS with measuring channels of
≥ 0.1 µm, ≥ 0.2 µm, ≥ 0.3 µm, ≥ 0.5 µm, ≥ 1.0 µm and ≥ 5.0 µm

Test parameters of the test environment:

- Cleanroom Air Cleanliness Class (according to ISO 14644-1):..... ISO 1
- Air flow velocity:.....0.45 m/s
- Air flow guidance:.....vertical unidirectional air flow
- Temperature:.....22 °C ± 0.5 °C (71.6 °F ± 0.9 °F)
- Relative humidity:..... 45 % ± 5 %

Test parameters of the test execution:

- Energy chain (reference):.....igus E3.15.060.032.0
- Length of cable:..... l = 1060 mm
- Bending radius of the chain:.....r = 60 mm
- Stroke length:.....s = 820 mm
- Parameter set 1:.....v_1 = 0.5 m/s; a_1 = 1.0 m/s²
- Parameter set 2:.....v_2 = 1.0 m/s; a_2 = 2.0 m/s²
- Parameter set 3:.....v_3 = 2.0 m/s; a_3 = 4.0 m/s²

Test results / Classification:
(according to ISO 14644-1)

MegaLine D1-20 S/U superflex 4P 11Y is suitable for use in cleanrooms fulfilling Air Cleanliness Class 2.

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Emission chamber measurements with thermodesorption and gas chromatography in combination with mass spectrometry (TD-GC / MS)

Test procedure: ISO 14644-8; ISO 16000-6, -9, -11; VDI 2083-17
Each standard stated refers to the version valid at the time of testing.

Measuring instruments:

- Working place: PerkinElmer Clarus 600, Clarus 600T, ATD 650
- Sample chamber: Markes International µCTE

Test parameters of the test environment:

- Temperature:..... 22 °C ± 0,5 °C
- Relative humidity:..... 45 % ± 5 %
- Ultra-pure air:.....VOC-filtered

Test parameters of the test execution:

- Pre-conditioning of the tested component at a temperature of 23 °C for 30 days
- Investigating the outgassing behavior of material samples at 23 °C / 90 °C

Test results / Classification:
(according to ISO 14644-8, VDI 2083 part 17)

The following specific emission rates were detected:

Test temperature	Family of contaminants	Specific emission rates [g / m²s]	ISO-AMC$_m$ class (x)
23 °C / 73 °F	TVOC	8.6 x 10^{-9}	-8.1
90 °C / 194 °F	Amines	not detectable	--
	Organophosphates	not detectable	--
	Siloxanes	not detectable	--
	Phthalates	not detectable	--

The detection limit during measurement amounts ISO-AMC$_m$class -9.6 (VOC). The ISO-AMC$_m$class (x) for the corresponding contamination group x is only awarded for the measurement at 23 °C (room temperature).

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.

The validity of this certificate applies only to the mentioned product in this particular condition for a duration of 5 years.
Further information: **www.tested-device.com**.

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Manufacturing Engineering and Automation IPA

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and Micromanufacturing

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Stuttgart, February 14, 2013
Place, Date

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Project manager