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DEVICE

SAMICK PRECISION IND.CO., Ltd
LMES10uu
Report No. SA 1709-944

DUPLICATE

Statement of
Qualification

Outgassing Behavior
VOC/SVOC

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Statement of Qualification

Customer

SAMICK PRECISION IND.CO., Ltd
925-2, Wulam, Dalseo-Gu
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South Korea

Component tested

Category: Automation Components

Subcategory: Transfer Systems and Bearing

Product name: LMES10uu
(manufacturing date: 7/20/2017; serial number: QG020)

Emission chamber measurements with purge-and-trap thermodesorption method and gas chromatography combined with mass spectrometry (TD-GC/MS)

Standards/Guidelines: ISO 14644-8, -15; ISO 16000-6, -9, -11, -25; VDI 2083 Part 17
The norms stated generally refer to the version valid at the time of the tests.

Testing equipment:
- Measuring station: ..... PerkinElmer Clarus 600, Clarus 600T, ATD 650
- Sampling chamber: ..... Markes International µCTE

Sample storage:
- Age of sample: ..... 41 days
- Pre-conditioning
  - Cleanroom Air Cleanliness Class (according to ISO 14644-1): ..... ISO 1
  - Airflow velocity: ..... 0.45 m/s
  - Airflow type: ..... vertical laminar flow
  - Temperature: ..... 22 °C ± 0.5 °C
  - Relative humidity: ..... 45 % ± 5 %
  - Purified air: ..... VOC-filtered

Test procedure parameters:
- Retention range (VOC): ..... C6 to C16
- Outgassing test temperatures: ..... 23 °C and 90 °C

Test result / Classification

The outgassing behavior of LMES10uu at the stated temperatures was investigated according to VDI 2083 Part 17. Based on the outgassing rates determined for the specific surfaces, the following material classification was made for the corresponding Contaminant Category:

Contaminant Category (x)	SER_u [1] 23 °C [g/unit·s]	SER_u [1] 90 °C [g/unit·s]	ISO-ACC_e Class (x) based on 23 °C
VOC	< 2.8 x 10^{-13}	< 1.7 x 10^{-12}	**< -12.6**
SVOC	< 2.8 x 10^{-13}	< 1.7 x 10^{-12}	**< -12.6**
Amines	< 2.8 x 10^{-13}	< 1.7 x 10^{-12}	--
Organophosphates	< 2.8 x 10^{-13}	< 1.7 x 10^{-12}	--
Siloxanes	< 2.8 x 10^{-13}	< 1.7 x 10^{-12}	--
Phthalates	< 2.8 x 10^{-13}	< 1.7 x 10^{-12}	--

[1] SER_u: Unit-specific emission rate

The detection limit at the time of the test was ISO-ACC_m Class = -9.6 (VOC/SVOC). The ISO-ACC_m Class (x) was assigned for the named contaminant categories at the test temperature of 23 °C (room temperature).

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.

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on behalf of
Dr.-Ing. Udo Gommel, Project Manager Fraunhofer IPA

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