



valid until: March 30, 2028

# Fraunhofer

## TESTED<sup>®</sup> DEVICE

eltherm GmbH  
ELPH-Cleanroom ID 40 mm  
**Report No. EL 2211-1363**

DUPLICATE

Statement of  
Qualification

Single product  
Outgassing Behavior  
VOC/SVOC

# Statement of Qualification · Single product

**Customer**  
 eltherm production GmbH  
 Ernst-Heinkel-Strasse 6-10  
 57299 Burbach  
 Germany

**Component tested**

Category: Process Equipment  
 Subcategory: Heating and Cooling  
 Product name: ELPH-Cleanroom ID 40mm  
 (manufacturing date: week 41/2022; color: gray; serial number: JCF0149  
 34/2022-01)

## Emission 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  
 The norms stated generally refer to the version valid at the time of the tests.

Testing equipment: Measuring station: ..... PerkinElmer Clarus 600, Clarus SQ8, ATD 650

Test procedure parameters:

- Retention range (VOC): ..... C6 to C16
- Outgassing test temperatures: ..... 23°C and 180°C
- Duration of preconditioning: ..... 24 h
- Heating sleeve surface: ..... 0.1 m<sup>2</sup>
- Sampling gas: ..... pure nitrogen
- Duration of sampling: ..... 1 h (23°C) and 10 min (180°C)
- Volume of the emission cell: ..... 2.5l
- Air change rate: ..... 40/h
- Emission cell material: ..... stainless steel
- Sampling flow rate: ..... 167 ml/min

## Test result / Classification

The outgassing behavior of ELPH-Cleanroom ID 40mm at room and operating temperature was investigated according to ISO 14644-15. Based on the outgassing rates determined for the specific equipment, the following material classification was made for the corresponding Contaminant Category:

Contaminant Category (x)	SER <sub>a</sub> <sup>1)</sup> 23°C [g/m <sup>2</sup> s]	ISO-ACC <sub>m</sub> Class (x) based on 23°C	SER <sub>a</sub> <sup>1)</sup> 180°C [g/m <sup>2</sup> s]	ISO-ACC <sub>m</sub> Class (x) based on 180°C
VOC	3.2 x 10 <sup>-10</sup>	<b>-9.5</b>	1.4 x 10 <sup>-8</sup>	<b>-7.9</b>
SVOC	< 2.8 x 10 <sup>-11</sup>	<b>&lt; -10.6</b>	2.6 x 10 <sup>-7</sup>	<b>-6.6</b>
Amines	< 2.8 x 10 <sup>-11</sup>	--	< 1.7 x 10 <sup>-10</sup>	--
Organophosphates	< 2.8 x 10 <sup>-11</sup>	--	< 1.7 x 10 <sup>-10</sup>	--
Siloxanes	3.2 x 10 <sup>-10</sup>	--	3.5 x 10 <sup>-9</sup>	--
Phthalates	< 2.8 x 10 <sup>-11</sup>	--	< 1.7 x 10 <sup>-10</sup>	--

<sup>1)</sup>SER<sub>a</sub>: Area-specific emission rate

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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on behalf of

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