valid until: March 30, 2028

Fraunhofer

TESTED®
DEVICE

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

Statement of
Qualification
Single product
Particle Emission

Fraunhofer
IPA

Fraunhofer
IPA

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 40 mm
(manufacturing date: week 41/2022; color: gray; serial number: JCF0149 34/2022-01)

Random sampling of particle emissions (airborne) at representative sites

Standards/Guidelines: ISO 14644-1, -14
The norms stated generally refer to the version valid at the time of the tests.

Test devices: Optical particle counter:
LasAir II 110 and LasAir III 110 with measuring ranges ≥ 0.1 µm, ≥ 0.2 µm, ≥ 0.3 µm, ≥ 0.5 µm, ≥ 1.0 µm and ≥ 5.0 µm

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 ± 0.5 °C
- Relative humidity: ..... 45 % ± 5 %

Test procedure parameters:

- Installation position: ..... horizontal
- Regulated average temperature: ..... 180 °C

Test result / Classification

When operated under the specified test conditions, the heating sleeve ELPH-Cleanroom ID 40 mm is suitable for use in cleanrooms fulfilling the specifications of the following Air Cleanliness Classes according to ISO 14644-1:

Test parameter(s)	Air Cleanlines Class
Heat up to approx. 180 °C	4
Maintain temperature at approx. 180 °C	2
Cool down to approx. 25 °C	3
Overall result	**4**

Please note: Transport damages, incorrect installation, aging behavior, corrosion, 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.

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

Department of Ultraclean Technology and Micromanufacturing

Nobelstrasse 12
70569 Stuttgart
Germany

EL 1603-812 — Report No. first document
Stuttgart, May 31, 2016 — Place, date of first document issued

EL 2211-1363 — Report No. current document
Stuttgart, March 30, 2023 — Place, current date

on behalf of
Dr.-Ing. Frank Bürger, Project Manager Fraunhofer IPA

This document only applies to the named product in its original state and is valid for a period of 5 years from the current date the document was issued. The document can be verified under **www.tested-device.com**.