



Fraunhofer

TESTED[®] DEVICE

eltherm GmbH
ELPH-Cleanroom ID 100 mm
Report No. EL 2211-1363

DUPLICATE

Statement of
Qualification

Single product
Particle Emission

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 100 mm (manufacturing date: week 41/2022; color: gray; serial number: JCF0150 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 $\geq 0.1\text{ }\mu\text{m}$, $\geq 0.2\text{ }\mu\text{m}$, $\geq 0.3\text{ }\mu\text{m}$, $\geq 0.5\text{ }\mu\text{m}$, $\geq 1.0\text{ }\mu\text{m}$ and $\geq 5.0\text{ }\mu\text{m}$
Test environment parameters:	<ul style="list-style-type: none">Cleanroom Air Cleanliness Class (according to ISO 14644-1):..... ISO 1Airflow velocity:.....0.45 m/sAirflow pattern:..... vertical laminar flowTemperature:22 °C ± 0.5 °CRelative humidity: 45 % ± 5 %
Test procedure parameters:	<ul style="list-style-type: none">Installation position: horizontalRegulated average temperature: 180 °C

Test result / Classification

When operated under the specified test conditions, the heating sleeve ELPH-Cleanroom ID 100 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	2
Maintain temperature at approx. 180 °C	2
Cool down to approx. 25 °C	2
Overall result	2

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	EL 1603-812 Report No. first document	Stuttgart, May 31, 2016 Place, date of first document issued
Department of Ultraclean Technology and Micromanufacturing	EL 2211-1363 Report No. current document	Stuttgart, March 30, 2023 Place, current date
Nobelstrasse 12 70569 Stuttgart Germany	on behalf of Dr.-Ing. Frank Bürger, Project Manager Fraunhofer IPA	