



Fraunhofer

TESTED[®] DEVICE

HEIN Ind.-Schilder
GEM-MARK

Report No. HE 2209-1349

DUPLICATE

Statement of
Qualification

Single product
Particle Emission

Customer	HEIN Industrieschilder GmbH Auwiesen 1 74889 Sinsheim Germany
Component tested	
Category:	Materials
Subcategory:	Coatings
Product name:	Cleanroom label "GEM-MARK" (manufacturing date: 8/23/2022; color: cyan, magenta, yellow, black, white; article number: 20000363317)

Random sampling of particle emissions (airborne) at representative sites

Standards/Guidelines:	ISO 14644-1, VDI 2083 Part 17 The norms stated generally refer to the version valid at the time of the tests.
Test devices:	Optical particle counter: LasAir II 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 \pm 0.5 °CRelative humidity: 45 % \pm 5 %
Test procedure parameters:	Ball-on-disc test vs. vs. stainless steel 1.3541/1.4034; normal force: 3 N

Test result / Classification

When operated under the specified test conditions, the Cleanroom label "GEM-MARK" is suitable for use in cleanrooms fulfilling the specifications of the following Air Cleanliness Class according to ISO 14644-1:

Material pairing and test		Air Cleanliness Class
Cleanroom label „GEM-MARK“	vs. stainless steel 1.3541 / 1.4034	1
Ball-on-disc test; normal force: 3 N		
Overall result		

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

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Nobelstrasse 12 70569 Stuttgart Germany	on behalf of Dr.-Ing. Frank Bürger, Project Manager Fraunhofer IPA	