IPA

valid until: October 2, 2029

Fraunhofer

TESTED® DEVICE

Knauf Ceiling Solutions
METAL BioGuard unperforated
Report No. KN 2405-1523

DUPLICATE

Statement of
Qualification

Single product
Particle Emission

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Customer

Knauf Ceiling Solutions GmbH & Co. KG
Elsenthal 15
94481 Grafenau
Germany

Component tested

Category: Cleanroom Facilities

Subcategory: Wall / Ceiling / Floor / Door

Product name: METAL BioGuard unperforated
(manufacturing date: 2/8/2024; color: white; article number: 2119M6; size:
600 x 600 mm; grid system: KCS T 24 and Clean Room 24)

Random sampling of particle emissions (airborne) at representative sites under atmospheric conditions

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 $\geq 0.1\,\mu m$, $\geq 0.2\,\mu m$,
$\geq 0.3\,\mu m$, $\geq 0.5\,\mu m$, $\geq 1.0\,\mu m$ and $\geq 5.0\,\mu m$

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: Parameter Set 1:
- Used grid system:... Clean Room 24
- Structure-borne noise: .... approx. 50 Hz
- Oscillation velocity (Ø):.................................... $v_1 = 10.0123\,mm/s$
- Oscillation acceleration (Ø):................................$a_1 = 3.1635\,m/s^2$
- Deflection of the system (Ø):...$s_1 = 0.0607\,mm$
Parameter Set 2:
- Used grid system:.. KCS T 24
- Structure-borne noise: .... approx. 50 Hz
- Oscillation velocity (Ø):.................................... $v_2 = 17.1915\,mm/s$
- Oscillation acceleration (Ø):................................$a_2 = 9.6210\,m/s^2$
- Deflection of the system (Ø):...$s_2 = 0.0646\,mm$

Test result / Classification

When operated under the specified test conditions, the ceiling system
METAL BioGuard unperforated 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
Structure-borne noise = approx. 50 Hz Grid System: KCS T 24	1
Structure-borne noise = approx. 50 Hz Grid System: Clean Room 24	1
Overall result	**1**

It must be pointed out, that according to ISO 14644-1 cleanrooms classes 1
to 5 have a high filter occupancy, with the result that large-surface ceiling
systems cannot be used in some cases. Cleanrooms with a horizontal displace-
ment flow form an exception to this.
The test result may be influenced by the surrounding ceiling system, in
particular the material pairing between the light and ceiling frame, as well as
other assembly accessories. Particle emission behavior should be re-assessed
in the respective assembly situation.

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

Stuttgart, October 2, 2024
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