



**Fraunhofer**

**TESTED<sup>®</sup>  
DEVICE**

Knauf Ceiling Solutions  
Armstrong Perla OP 1.0 20 mm  
**Report No. KN 2101-1202**

DUPLICATE

Statement of  
Qualification

Single product  
Particle Emission

Customer

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

Component tested

Category:Cleanroom Facilities

Subcategory:Wall/Ceiling/Floor/Door

Product name:Armstrong Perla OP 1.0 20 mm  
(manufacturing date: 10/8/2020; article number: BP3861;  
dimension: 600x600x20 mm)

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:

- 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  $\pm$  0.5 °C
- Relative humidity: ..... 45 %  $\pm$  5 %

Test procedure parameters:The ceiling system was subjected to stress as follows:

- Structure-borne noise: .....approx. 5 to 50 Hz
- Oscillation velocity ( $\varnothing$ ):.....v = 0.7037 mm/s
- Oscillation acceleration ( $\varnothing$ ):.....a = 0.0192 m/s<sup>2</sup>
- Deflection of the system ( $\varnothing$ ):.....s = 0.1381 mm

Test result / Classification

When operated under the specified test conditions, the ceiling system Armstrong Perla OP 1.0 20 mm is suitable for use in cleanrooms fulfilling the specifications of the following Air Cleanliness Class according to ISO 14644-1:

Test parameter(s)	Air Cleanliness Class
Structure-borne noise = approx. 5 to 50 Hz	2
Overall result	

It should be noted that cleanrooms of class 1 to 5 according to ISO 14644-1 have a higher filter occupancy, which may restrict the use of ceiling systems. Cleanrooms with a horizontal displacement flow form an exception to this.

The test result may be affected by the surrounding ceiling system, in particular the material pairing between lights and ceiling frames, as well as other mounting accessories. Particle emission behavior should be reassessed in each 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 Engineering and Automation IPA

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on behalf of  
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