



# Fraunhofer

## TESTED<sup>®</sup> DEVICE

Knauf Ceiling Solutions  
THERMATEX Aquatec  
**Report No. KN 2308-1449**

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:	Mineral ceiling tile THERMATEX Aquatec (manufacturing date: 5/30/2023; dimensions: 600 x 600 x 19 mm; article number: 713596)

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 $\geq 0.1 \mu\text{m}$ , $\geq 0.2 \mu\text{m}$ , $\geq 0.3 \mu\text{m}$ , $\geq 0.5 \mu\text{m}$ , $\geq 1.0 \mu\text{m}$ and $\geq 5.0 \mu\text{m}$
Test environment parameters:	<ul style="list-style-type: none"><li>Cleanroom Air Cleanliness Class (according to ISO 14644-1):..... ISO 1</li><li>Airflow velocity:..... 0.45 m/s</li><li>Airflow pattern:..... vertical laminar flow</li><li>Temperature: ..... <math>22^\circ\text{C} \pm 0.5^\circ\text{C}</math></li><li>Relative humidity: ..... <math>45\% \pm 5\%</math></li></ul>
Test procedure parameters:	The ceiling system was subjected to stress as follows: <ul style="list-style-type: none"><li>Structure-borne noise: ..... approx. 50 Hz</li><li>Oscillation velocity (<math>\varnothing</math>):..... <math>v = 3.7140 \text{ mm/s}</math></li><li>Oscillation acceleration (<math>\varnothing</math>):..... <math>a = 1.2808 \text{ m/s}^2</math></li><li>Deflection of the system (<math>\varnothing</math>):..... <math>s = 0.0538 \text{ mm}</math></li></ul>

Test result / Classification

When operated under the specified test conditions, the mineral ceiling tile THERMATEX Aquatec is suitable for use in cleanrooms fulfilling the specifications of the following Air Cleanliness Class according to ISO 14644-1:


Test parameter(s)	Air Cleanlines Class
Structure-borne noise = approx. 50 Hz	4
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 flat 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 luminaire frame and ceiling system, as well as other mounting accessories. Particle emission behavior should be reassessed in each assembly situation.

The cut edges/backside of the PO05 consist of very porous material. This is to be considered critical in clean/hygienic areas.  
  
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	KN 1804-1030 Report No. first document	Stuttgart, June 28, 2018 Place, date of first document issued
Department of Ultraclean Technology and Micromanufacturing	KN 2308-1449 Report No. current document	Stuttgart, September 15, 2023 Place, current date
Nobelstrasse 12 70569 Stuttgart Germany	on behalf of  Dr.-Ing. Frank Bürger, Project Manager Fraunhofer IPA	