



# Fraunhofer

## TESTED<sup>®</sup> DEVICE

Ziehl-Abegg SE  
HF C27021 14 black  
**Report No. ZI 2507-1655**

Statement of  
Qualification

Single product  
Outgassing Behavior  
Inorganic Acids

Statement of Qualification · Single product

Customer	Ziehl-Abegg SE Heinz-Ziehl-Strasse Künzelsau Germany
Tested product	
Category:	Materials
Subcategory:	Plastics
Product name:	HF C27021 14 black (manufacturing date: 5/2025; color: black; article number: 00412286)

Emission chamber measurements with gas impingement in combination with ion chromatography (IC)

Standards/guidelines:	ISO 14644-8, -15; VDI 2083 Part 17 The norms stated generally refer to the version valid at the time of the tests.
Test equipment:	<ul style="list-style-type: none"><li>Measuring station:.....Metrohm Professional IC 850</li><li>Sampling chamber:.....Markes International µCTE</li></ul>
Sample storage:	<ul style="list-style-type: none"><li>Pre-conditioning:<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 type:.....vertical laminar flow</li><li>Temperature: .....22 °C ± 0.5 °C</li><li>Relative humidity: .....45 % ± 5 %</li><li>Purified air: .....VOC-filtered</li></ul></li></ul>
Test procedure parameters:	<ul style="list-style-type: none"><li>Volume of micro emission chamber: .....45 cm³</li><li>Preconditioning time: .....&gt; 5 min</li><li>Temperature during emission sampling: .....23 °C</li><li>Duration of emission sampling:.....24 h</li><li>Sampling flow rate: .....100 mL/min</li></ul>

Test result / Classification

The outgassing behavior of HF C27021 14 black at the stated temperature was investigated according to ISO 14644-15 and VDI 2083 Part 17. Based on the outgassing rates determined for the specific surfaces, the following material classification was made for the corresponding Contaminant Category:

Contaminant Category (x)	SER <sub>a</sub> <sup>1)</sup> 23 °C [g/m²s]	ISO-ACC <sub>m</sub> Class (x)
Hydrofluoric acid (HF)	< 2.9 x 10 <sup>-9</sup>	< -8.5
Hydrochloric acid (HCl)	< 2.9 x 10 <sup>-9</sup>	< -8.5
Hydrobromic acid (HBr)	< 2.9 x 10 <sup>-9</sup>	< -8.5
Nitric acid (HNO <sub>3</sub> )	< 2.9 x 10 <sup>-9</sup>	< -8.5
Phosphoric acid (H <sub>3</sub> PO <sub>4</sub> )	< 2.9 x 10 <sup>-9</sup>	< -8.5
Sulfuric acid (H <sub>2</sub> SO <sub>4</sub> )	< 2.9 x 10 <sup>-9</sup>	< -8.5

<sup>1)</sup>The emission rate is calculated using the detected concentration based on the external standard calibration, the analyzed sample surface area or number of samples, the volume of the impingement solution and the sampling duration.

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

Business unit Testing and Certification

Nobelstrasse 12  
70569 Stuttgart  
Germany


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Dr.-Ing. Frank Bürger, head of business unit Testing and Certification

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