



**Fraunhofer**

**TESTED<sup>®</sup>  
DEVICE**

Trox GmbH  
MFPCR series H14 Filter  
**Report No. TR 1910-1144**

DUPLICATE

Statement of  
Qualification

Single product  
Outgassing Behavior  
VOC/SVOC

# Statement of Qualification · Single product

**Customer**  
 Trox GmbH  
 Heinrich-Trox-Platz  
 47504 Neukirchen-Vluyn  
 Germany

**Component tested**  
 Category: Cleanroom Facilities  
 Subcategory: Filtration Systems  
 Product name: MFPCR series H14 Filter  
 (manufacturing date: 6/2019; article number: MFPCR-H14-ALD/  
 1314x600x66x46/PD/RAL9010/0/CSU; serial number: DE1248619/10;  
 filter class: H14; Integrity tested using DEHS: yes)

**Emission chamber measurements with purge-and-trap thermodesorption method and gas chromatography combined with mass spectrometry (TD-GC/MS)**

Standards/Guidelines: ISO 14644-8, -15; ISO 16000-6, -9, -11, -25  
 The norms stated generally refer to the version valid at the time of the tests.

Testing equipment:
 

- Measuring station: ..... PerkinElmer Clarus 600, Clarus SQ8, ATD 650
- Sampling chamber: .....Markes International µCTE

Equipment pre-conditioning:
 

- Tested on: .....7/2/2019
- Running-in period: ..... 24 h
- Cleanroom Air Cleanliness Class (according to ISO 14644-1): ..... ISO 1
- Airflow velocity: ..... 0.45 m/s
- Airflow type: ..... vertical laminar flow
- Temperature: ..... 23 °C
- Relative humidity: ..... 45 %
- Purified air: ..... VOC-filtered

Test procedure parameters:
 

- Retention range (VOC): ..... C6 to C16
- Outgassing test temperatures: ..... 23 °C

**Test result / Classification**

The outgassing behavior of the MFPCR series H14 Filter at the stated temperatures was investigated according to ISO 14644-15. Based on the outgassing rates determined for the specific units, the following equipment classification was made for the corresponding Contaminant Category:

Contaminant Category (x)	SER <sub>u</sub> <sup>1)</sup> 23 °C [g/unit·s]	ISO ACC <sub>e</sub> Class (x) based on 23° C
VOC	< 4.5 x 10 <sup>-10</sup>	< -9.3
SVOC	4.7 x 10 <sup>-11</sup>	-10.3
Amines	<sup>2)</sup> not detectable	--
Organophosphates	<sup>2)</sup> not detectable	--
Siloxanes	<sup>2)</sup> not detectable	--
Phthalates	<sup>2)</sup> not detectable	--

<sup>1)</sup>SER<sub>u</sub>: unit-specific emission rate detection limit for VOC: 4.5 x10<sup>-10</sup>  
<sup>2)</sup>SER<sub>e</sub>: unit-specific emission rate detection limit for the substance groups amines, organophosphates, siloxanes and phthalates: 2.8 x 10<sup>-12</sup>

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

Department of Ultraclean Technology and Micromanufacturing

Nobelstrasse 12  
 70569 Stuttgart  
 Germany

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