IPA

Cleanroom (atmospheric)

valid until: November 26, 2030

Fraunhofer

TESTED®
DEVICE

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

Statement of
Qualification

Single product
Outgassing Behavior
VOC/SVOC

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

Standards/guidelines: ISO 14644-8, -15; ISO 16000-25; VDI 2083 Part 17
The norms stated generally refer to the version valid at the time of the tests.

Test equipment: Measuring station: ..... PerkinElmer Clarus 680, Clarus SQ8, ATD 650

Sample storage:

- Pre-conditioning:
  - Cleanroom Air Cleanliness Class (according to ISO 14644-1): ..... ISO 1
  - Airflow velocity: ..... 0.45 m/s
  - Airflow type: ..... vertical laminar flow
  - Temperature: ..... 22 °C ± 0.5 °C
  - Relative humidity: ..... 45 % ± 5 %
  - Purified air: ..... VOC-filtered

Test procedure parameters:

- Retention range (VOC): ..... C6 to C16
- Retention range (SVOC): ..... > C16
- Temperature during emission sampling: ..... 23 °C
- Preconditioning time: ..... > 5 min
- Sampling flow rate: ..... 100 ml/min
- Duration of emission sampling: ..... 60 min
- Volume of micro emission chamber: ..... 45 cm^3

Test result / Classification

The outgassing behavior of HF C27021 14 black at the stated temperature was investigated according to ISO 14644-15, ISO 16000-25 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_a [1] 23°C [$g/m^2 \cdot s$]	ISO-ACC_m Class (x)
VOC	3.1 x 10^{-9}	**-8.5**
SVOC[2]	3.0 x 10^{-9}	**-8.5**
Sum VOC+SVOC	6.1 x 10^{-9}	**--**
Refractories[3]	1.0 x 10^{-9}	**--**
Siloxanes[4]	1.0 x 10^{-9}	**--**

[1] The emission rate is calculated using the detected mass based on the response of the standard, the analyzed unit and the sampling duration.
[2] According to ISO 16000-25, SVOC is the sum of airborne and condensable SVOC
[3] Refractories are compounds containing elements other than C, H and O (for example S, P, N, Si,…).
[4] Siloxanes and other organic substances containing silicon. Siloxanes are also classified as refrac tories.

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.

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on behalf of
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