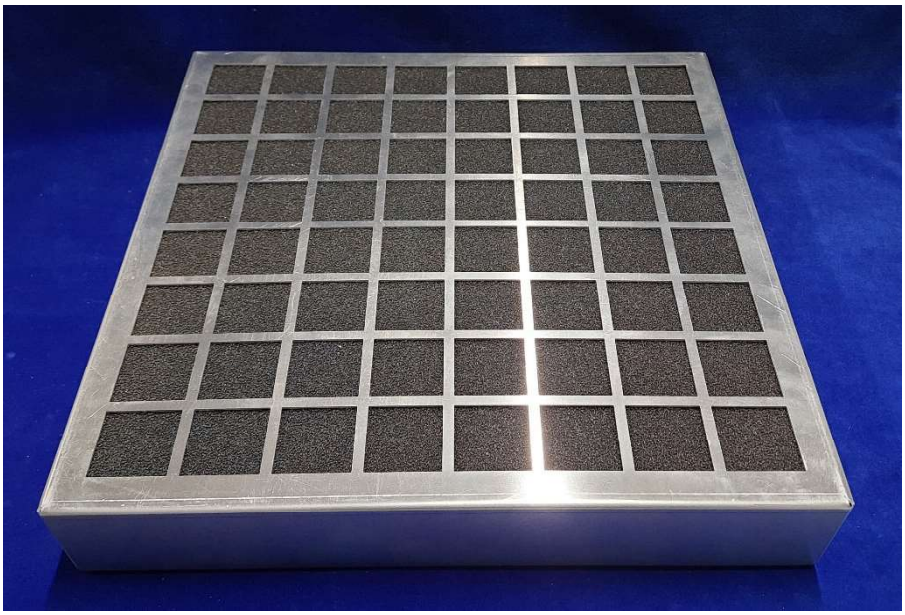
LGA InterCert
Zertifiziertes QM-System
DIN EN ISO 9001:2015

fiatec
Filter & Aerosol Technologie GmbH

PERFORMANCE TEST ON ONE FILTER ELEMENT

VLA-EC



TEST REPORT MAS 230601

Mainleus, November 24th, 2023

acc. to ISO 11155-2

initiated by:

MASAM PURIFICADORES S.L.

1. Objectives and test set-up

This test project focused on the filtration performance of one filter element according to the test procedure below. All test conditions and parameters not given will be chosen according to DIN 71460-1 / ISO 11155-2 „Air filters for passenger compartments".

a)	Test requested by:	Masam Purificadores S.L.
b)	Test specimen / Construction:	Adsorber bed in metal frame
c)	Model / Parts ID:	VLA-EC
d)	Dimensions:	403 x 402 x 70 [mm]
e)	Samples received:	September 11th, 2023
f)	Test performed:	November 1st – 21st, 2023

Table 1: Test procedure adsorption / test sequence

No.	Test fiatec-no.: MAS 230601_	PL1
A1	Filter weight	x
A2	Conditioning under test cond.	x
A3	Adsorption test with 0,2 ppm Ozone	1
A4	Adsorption test with 1 ppm NOx [1)]	2
A5	Adsorption test with 2 ppm NO [1)]	3
A6	Adsorption test with 0,6 ppm Formaldehyde	4
A7	Adsorption test with 1 ppm SO2	5

[1)] The concentrations of all nitrogen oxides (NO_x) and nitrogen dioxide (NO_2) were detected in parallel.

Test conditions

Flow rate:	200 m³/h
Temperature:	23°C ± 1K
Relative humidity:	50% ± 3%
Test gas concentration:	see table 1 ± 5%
Test duration:	15 minutes

The accuracy of the flow controls is 2% of the nominal value.

1) The analysis of ozone was done with an Ozone-Analyser, APOA 360, company Horiba. The detection limits is appr. 1-2 ppb.

2) During the adsorption test with nitrogen dioxide (NO_2), the total concentration of all nitrogen oxides (NOx) and the concentration of nitrogen monoxide (NO) were recorded in parallel. The concentration of nitrogen dioxide (NO_2) was calculated from the difference between them. It is assumed that only NO and NO_2 are present in the clean gas. The occurrence of small amounts of other nitrogen oxides is neglectable. The molar mass of nitrogen dioxide was used to calculate the NOx adsorption capacity. NO_2 results (especially capacity) are theoretical values because they do not consider the converted mass to NO (see also NOx).

3) The detection of NO was done in the same way as NO2 (Chemiluminescence detector Horiba APNA 370). The detection limit is < 0,02 ppm absolute.

4) The analyses of Formaldehyde has been done with a FTIR, company Gasmet, Model DX4015. Concentrations < 0,1 ppm are considered as less reliable. The standard deviation of the zero level is ca. 0,02 ppm.
5) The SO2-concentrations were measured with an UV-Fluorescence analyser, APSA 360 (Horiba). The detection limit is < 0,02 ppm absolute.

The test rig used is according to ISO 11155-2. The airflow is from up to down (vertical) with horizontal installed filter elements.


Closed test rig chamber


Filter installation (different sample)

2. Adsorption results

Table 2: Summary of the most important adsorption results

sequence	test gas	Raw gas conc. [ppm]	Initial break-through [%]	after 1 minute [%]	after 5 minutes [%]	after 10 minutes [%]	after 15 minutes [%]	Adsorbed Mass [mg]
1	**Ozone**	0,197	4,0	4,6	4,9	5,2	5,4	18
2	**NO_X**	1,05	6,0	6,6	7,2	7,4	7,4	87
2	**NO_2**		4,8	5,9	6,2	6,4	6,5	87
3	**NO**	1,85	18,1	25,2	27,4	28,1	28,3	80
4	**Formald.**	0,605	7,6	12,6	21,2	26,1	28,5	28
5	**SO_2**	0,99	0	0	0	0	0	125

Steffan Trnetschek
(Managing Director)

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NOTA EXPLICATIVA: El break-through es el porcentaje de gas que el filtro deja pasar, por lo que su retención media a lo largo del ensayo es del 95.18% para el Ozono, 93.08% para el NOx, 94.04% para el NO2, 74.58% para el NO, 80.8% para el Formaldehido y 100% para el SO2. (El menor break-through siempre será en una primera pasada de gas y después augmentará ligeramente hasta estabilizarse)