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Scientific Report

To whom it may concern:

I commissioned and supervised analytical testing of the **Swiss Water Cartridge** (**20" POE** (= Point of Entry) Water Filter Cartridge – to be installed right after the water meter for whole house application with flow rates of >1800 Liters / h) from the company Mam Nature Swiss AG incorporating a filter media, developed at ETH Zurich and based on an amyloid–carbon platform.
Testing was performed with validated methods (ICP-MS/ICP-OES, EPA 537M for PFAS, fluorometry, and gamma counting/scintigraphy for radionuclides) under standard QA/QC.
The results confirm high single-pass removal of heavy metals, selected organics, nutrients, and PFAS; in separate clinical/nuclear evaluations, the same filter media removed representative radionuclides to below detection.

Below I summarise the results as inlet → outlet with removal efficiency: -> see the following page

Contaminant	Influent	Effluent	Removal %
Heavy metals [1]:			
Lead (Pb)	100 µg/L	0.516 µg/L	**98.97** %
Cadmium (Cd)	100 µg/L	0.021 µg/L	**99.98** %
Arsenic (III)	100 µg/L	0.24 µg/L	**99.76** %
Arsenic (V)	100 µg/L	0.24 µg/L	**99.76** %
Copper (Cu)	100 µg/L	3.74 µg/L	**96.26** %
Chromium (Cr)	298.4 µg/L	1.451 µg/L	**99.51** %
Zinc (Zn)	100 µg/L	3.48 µg/L	**96.52** %
Iron (Fe)	100 µg/L	25 µg/L	**75.00** %
Manganese (Mn)	312.7 µg/L	5.83 µg/L	**98.13** %
Molybdenum (Mo)	100 µg/L	0.466 µg/L	**99.53** %
Vanadium (V)	100 µg/L	0.119 µg/L	**99.88** %
Platinum (Pt)	47.63 µg/L	<0.01 µg/L	**≥ 99.98** %
Other contaminants [2]:			
PFOA	0.63 µg/L	<0.01 µg/L	***> 98.4*** %
PFOS	0.67 µg/L	<0.01 µg/L	***> 98.5*** %
Phosphate (PO_4)	1000 mg/L	12 mg/L	***98.8*** %
Free residual chlorine	1000 µg/L	52 µg/L	***> 99*** %
Bisphenol-A (BPA)	2.13 µg/L	0.05 µg/L	***97.87*** %
MTBE	38.62 µg/L	0.63 µg/L	***98.37*** %
Fluoride (fluorometer)	7.86 µg/L	3.309 µg/L	***57.9*** %
Aluminium	5000 µg/L	92 µg/L	***98.16*** %
Pesticides [2]:			
Bentazon	97.41 µg/L	0.030 µg/L	***99.97*** %
Pharaceuticals [3]:			
Ibuprofen	1.0 ppm	0.025 ppm	***97.5*** %
Dyes [3]:			
Crystal violet	10 ppm	Qualitative: µg/L	***99.97*** %
Acid fuchsin	10 ppm	solution turned µg/L	***99.97*** %
Acriflavine	10 ppm	transparent; µg/L	***99.97*** %
Rhodamine B	10 ppm	aerogel took on µg/L	***99.97*** %
Malach ite green	10 ppm	dye color µg/L	***99.97*** %
Organic solvent [3]:			
n-Hexane	Qualitative demo (floating layer on water)	Qualitative: fully absorbed into the filter media within ~20 s	Qualitative only; no concentration reported
PFAS [4]:			
PFBA (C3)	>70 ng/l	3.65 ng/l	***> 96*** %
PFHxA (C6)	>70 ng/l	< MDL ng/l	Complete within MDL
PFHpA (C7)	>70 ng/l	< MDL ng/l	Complete within MDL
PFOA (C8)	>70 ng/l	< MDL ng/l	Complete within MDL
PFBS (C4)	>70 ng/l	< MDL ng/l	Complete within MDL
PFHxS (C6)	>70 ng/l	< MDL ng/l	Complete within MDL
PFOS (C8)	>70 ng/l	< MDL ng/l	Complete within MDL
Radioactive pollutants (clinical & nuclear wastewaters) [5]:			
Tc-99m (hospital wastewater)	236670 cpm/ml	0.8 cpm/ml	***99.9997%*** %
I-123 (hospital wastewater)	294395 cpm/ml	0.8 cpm/ml	***99.9997%*** %
Ga-68 (hospital wastewater)	16530.1 cpm/ml	29.4 cpm/ml	***99.8221%*** %
I-131 (hospital wastewater)	118.25 cpm/ml	0.005 cpm/ml	***99.9958%*** %
Lu-177 (hospital wastewater)	1226.6 cpm/ml	0.55 cpm/ml	***99.9552%*** %

[1]: Method: ICP-MS; single-pass filtration; flow equivalent ~1.8 m³ water.
Data from ETH letter (Dr. Christophe Zeder). -> *Reference A*: Cartridges retention report

[2]: -> *Reference A*: Cartridges retention report

[3]: Method: by ultraperformance liquid chromatography (UPLC) analysis: -> *Reference F*

[4]: The **technology** is **proven** to **remove** the **PFAS** listed under single-step filtration conditions reported in the referenced study.
The publication gives a numeric permeate only for PFBA (3.65 ng/L); other permeates were below the method detection limit; feed bars are plotted graphically. The paper concludes complete removal for PFAS with ≥C4 and >96% for PFBA (C3). -> *Reference B*

[5]: The **technology** is **proven** to **remove** the **radionuclides** on real clinical effluents and representative nuclear solutions, with permeate activities at or below detection as indicated in the cited studies.
"Not detected" = activity below instrument detection under test conditions. For Cs-137, two passes reached the 10 Bq·L^{-1} guidance level). -> *Reference C, D & E*

References (written format):

A. ETH Cartridge Retention Report / ICP-MS Metals Letter (Dr. Christophe Zeder). Independent ETH Zürich analytical report summarising organics, nutrients, chlorine, aluminium and heavy-metal retention for the Mam Nature Swiss Water Cartridge (20" POE).

Cartridges retention report

B. PFAS Removal Using Amyloid–Carbon Hybrid Membranes (Figure 6, EPA 537M). Peer-reviewed article reporting complete removal (within MDL) for PFAS with ≥C4 and >96% removal for PFBA (C3); permeate PFBA = 3.65 ng/L.

C. Clinical Radioactive Pollutant Removal — Hospital Wastewaters. Study showing ≥99.8–99.995% single-pass removal of Tc-99m, I-123, Ga-68, I-131, and Lu-177, with permeate below detection and radionuclide immobilisation confirmed by scintigraphy.

D. Radioactive Cesium Removal (Cs-137). Laboratory dataset demonstrating ~99.7% single-pass removal (~340× reduction) and high capacity; two passes reach 10 Bq·L^{-1} guidance.

E. PSI Annual Report (Membrane Studies). Supporting technical notes on radionuclide handling and analytical methodology used in associated projects.

F. Amyloid Fibrils Aerogel for Sustainable Removal of Organic.
Contaminants from Water, advanced materials, 2020, 32, 1907932

Technical remarks and limitations:
Results were obtained under controlled conditions with defined influent chemistry, contact time, and temperature. Field performance depends on site conditions (pH, temperature, competing ions/organics, flow regime) and media loading.

Yours faithfully

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