

Environmental Product Declaration

In accordance with ISO 14025:2006
and EN 15804:2012+A2:2019/AC:2021 for:

HQ55 Serie Bag Filter

HQ55A8-6

from

AFPRO Filters B.V.

| | |
|---------------------------------|---|
| Programme: | Open LCA with EcolInvent database |
| Programme operator: | Open LCA |
| EPD registration number: | Internal verification |
| Publication date: | 2025-03-04 |
| Valid until: | 2030-03-04 |
| | An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com |

HQ55A8-6 /Bag filter ePM10 70%



General information

Programme information



| | |
|------------|---|
| Programme: | OpenLCA 2.2.0 |
| Address: | GreenDelta Alt-Moabit 130 10557 Berlin Germany |
| Website: | https://www.openlca.org/ |
| E-mail: | gd@greendelta.com |

Accountabilities for PCR, LCA and independent, third-party verification

Product Category Rules (PCR)

CEN standard EN 15804 serves as the Core Product Category Rules (PCR)

Product Category Rules (PCR): Currently none for Air Filters, are in draft version

PCR review was conducted by: Currently in draft version, released next year

Life Cycle Assessment (LCA)

LCA accountability/Study conducted by: AFPRO Filters B.V., Stephanie Telmo & Yanbin Zhuo

Third-party verification – Internal Verification by Stephanie Telmo

Procedure for follow-up of data during EPD validity involves third party verifier:

☐ Yes ☒ No

[Procedure for follow-up the validity of the EPD is at minimum required once a year with the aim of confirming whether the information in the EPD remains valid or if the EPD needs to be updated during its validity period. The follow-up can be organized entirely by the EPD owner or together with the original verifier via an agreement between the two parties. In both approaches, the EPD owner is responsible for the procedure being carried out. If a change that requires an update is identified, the EPD shall be re-verified by a verifier]

Company information



Owner of the EPD:

AFPRO Filters B.V.

Contactperson:

Yanbin Zhuo and Stephanie Telmo

+31 72 567 55 29

Yzhuo@afprofilters.com / Stelmo@afprofilters.com

Description of the organisation:

At AFPRO, we understand the significance of clean air. We are committed to protecting the safety and improving the well-being of students, employees, and patients in indoor environments such as schools, offices, factories, and hospitals. We strive to develop innovative air filtration solutions that extend lives, protect critical environments and production processes, and meet our customers' most demanding air purification requirements.

More information about the organisation can be found on the website of AFPRO Filters.

This Environmental Product Declaration (EPD) provides detailed information on the environmental performance of a compact air filter used in various industrial and commercial applications. The assessment is conducted according to the principles of ISO 14025 and EN 15804, which provide the framework for transparency and comparability in environmental product information.

Product-related or management system-related certifications:

Eurovent Certita certificate, N° 09.10.433, ECP FIL - « Air Filters », valid until 31/08/2025

VDI 6022 part 1 and VDI 3803 part 4 Certificate filters, valid from 01-07-2019

NEN-EN-ISO9001:2015 Certificate, TUV Nord, valid until 25-11-2026

NEN-EN-ISO14001:2015 Certificate, TUV Nord, valid until 15-11-2026



Name and location of production site(s):

AFPRO Filters EAF

East of University Road 253034

DEZHOU CITY

**Product name:**

HQ Bag Series (HQ55A8-6)

Product identification:

Bag filter ePM10 70%

UN CPC code:

CPC 2.1: 43914 – Filtering or purifying machinery and apparatus, for liquids or gases, except oil filters, petrol filters and air intake filters for internal combustion engines.

HS 2017: 842139 – Machinery; for filtering or purifying gases, other than intake air filters for internal combustion engines.

Geographical scope:

Europe/Asia

Product Information

Product description:**HQ55 SERIES BAG FILTER**

AFPRO Filters bag filters are designed for use as pre-filters or fine filters in air conditioning and industrial systems. Engineered for optimal efficiency, they comply with ISO 16890 standards and are available in filter classes ISO Coarse, ePM10, ePM2.5, and ePM1. Additionally, ePM1, ePM2.5, and ePM10 variants are Eurovent-certified, ensuring top-tier performance.

Constructed with high-quality polymer and glass fiber media, these filters are housed in a durable steel or aluminum frame, providing excellent structural integrity. Their innovative design ensures minimal airflow resistance, enhancing energy efficiency. Capable of withstanding temperatures up to 70°C and 95% relative humidity, AFPRO bag filters are ideal for air conditioning units, industrial systems, clean rooms, and pharmaceutical applications.

For environments with high particulate matter concentrations, the HQ-series bag filters offer superior performance. They feature a new generation of ultra-fine fibers with a dense membrane to prevent fiber migration, ensuring clean and safe air quality. With an A+ energy rating, the HQ-series delivers the highest level of energy efficiency, making them a sustainable choice for demanding applications.

**Specification:**

Application: Fine filter, HVAC, industry

Frame: Galvanized steel/aluminum

Spacers: Sewing thread

Bonding: -

Medium: Glass fiber

Gasket: Optional, continuous poured gasket

Filter class according to ISO 16890: ePM10

Maximum final pressure drop: 450Pa

Maximum temperature: 70°C

Maximum relative humidity: 90%

Advantages:

- Lightweight frame
- High dust holding capacity
- Constant efficiency
- Protective pre-layer
- No fiber shedding

Options:

- ATEX



Life Cycle Analysis



Functional unit / declared unit:

One Bag Filter

Reference service life:

One year

Time representativeness:

Data is collected for the LCA in 2023 and 2024. A1-A5 is based on data from 2023. Data with regard to A3-A4 is collected since 2014 and updated until 2023.

Database(s) and LCA software used:

EcoInvent v. 3.10

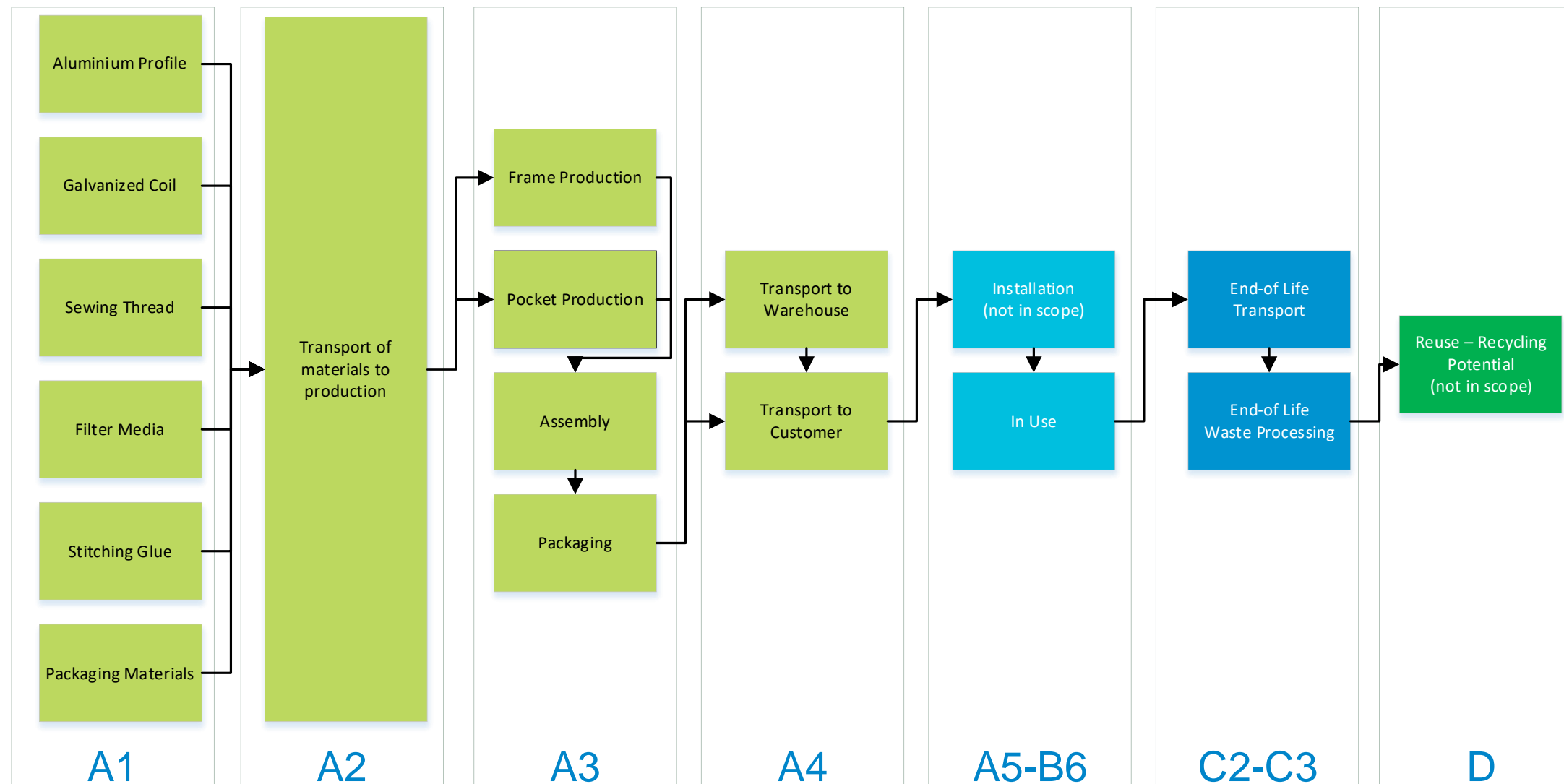
OpenLCA v2.2.0

Description of system boundaries:

The lifecycle includes all mandatory and optional modules A1-A4, B6, C2-C4. The report complies with the ISO standards. This EPD is for specific products within the HQ bag filter. HQ55A8-6.

| | Product stage | | | Construction process stage | | Use stage | | | | | | | End of life stage | | | | Resource recovery stage |
|------------------|---------------------|-----------|---------------|----------------------------|---------------------------|-----------|-------------|--------|-------------|---------------|------------------------|-----------------------|----------------------------|-----------|------------------|----------|------------------------------------|
| | Raw material supply | Transport | Manufacturing | Transport | Construction installation | Use | Maintenance | Repair | Replacement | Refurbishment | Operational energy use | Operational water use | De-construction demolition | Transport | Waste processing | Disposal | Reuse-Recovery-Recycling-potential |
| Module | A1 | A2 | A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D |
| Modules declared | x | x | x | x | n.a. | tbd | n.a. | n.a. | n.a. | n.a. | x | n.a. | n.a. | x | x | x | tbd |
| Geography | EU | EU | CN | EU | x | x | x | x | x | x | EU | x | x | NL | NL | NL | x |

System Boundaries:



LCIA:

The LCIA is divided into distinct modules representing different stages of the product's life cycle, from raw material extraction to disposal. Each module is assessed for its environmental impacts, considering energy use, emissions, resource consumption, and waste generation.

Module A1 -A3: Product Stage:

A1: Raw Material Supply

This module covers the extraction and processing of raw materials used in the production of the filter, including Filter Media, Frame, Hotmelt, glue and packaging materials. All relevant materials are accounted for, and their environmental impacts are included in the assessment.

A2: Transport

Transportation of raw materials to the manufacturing site is included in this module. The environmental impacts associated with the logistics, including fuel consumption and emissions, are within the scope. We used an estimate of 200 km per supplier who ships from the inside of China to our production facility. For the Media we used an estimate of 2000km from supplier to our production facility.

A3: Manufacturing

The manufacturing process encompasses all activities involved in producing the filter. This includes the assembly of components, energy use, and emissions during production including generic transport. The assessment covers the full scope of manufacturing impacts.

Module A4-A5: Construction process stage

A4: Transport to Site:

Transportation of the filter from the production facility to our Warehouse in Alkmaar, The Netherlands and/or to the customer. We used an estimate based on shipped packages over 2023 and in which country the highest volumes of filters were sold. The estimate used is 100 km per unit.

Module B1-B6: Use Stage:

B1: Use/application

This module calculates possible damage/benefits of the item application. A single value is calculated to represent the quantity of particulate pm2.5 matter reduction after passing through the filter.

B6: Operational Energy Use

This module quantifies the energy consumption during the operation of the filter, including the impacts of electricity or other energy sources used for air handling. Based on calculation made by Eurovent – last update: may 2024.

Module C1 – C4: End-of-Life Stage:

C2: Transport to Waste Processing

This module covers the transportation of the filter components to waste processing facilities. The environmental impacts of transport logistics are included.

C3: Waste Processing

The processing of waste materials, including recycling or disposal, is considered. The impacts associated with waste treatment methods are assessed.

C4: Disposal

Final disposal of the filter, including landfill or incineration, is within the scope. The environmental impacts of disposal methods are considered. C3 is waste processing, because the waste processing is incineration, it is combined with C4 (disposal). We currently have a contract with a waste processing company in The Netherlands to retrieve the filters and check whether parts can be reused, recycled or have to be incinerated.

Excluded:

Certain activities and processes have been excluded from the assessment due to the reasons outlined below:

- *B1 (Use)*: Excluded as calculations are not complete.
- *A5 (Installation)*: Excluded since the company does not perform installation.
- *Journey to Work*: Excluded as it does not significantly contribute to the environmental impact.
- *C1 (Deconstruction)*: Excluded as it is not applicable to the company's operations.
- *D (Reuse, Recovery, Recycling)*: Excluded as this module is still under development.

Cut off criteria:

- *Mass*: All individual materials or components that represent more than 1% of the total product mass are included. Aggregated materials accounting for more than 95% of the total mass are also included.
- *Energy*: All processes and energy inputs contributing more than 1% to the total energy consumption are included.
- *Environmental Relevance*: Any material or process with a significant environmental impact, even if it is less than 1% by mass or energy, is included.

In this assessment, approximately 100% of the materials and processes have been inventoried and included, ensuring a comprehensive and accurate representation of the product's environmental impact.

Content information HQ55A8-6

| Product components | Weight, kg | Post-consumer material, weight-% | Renewable material, weight % |
|---------------------|------------|----------------------------------|------------------------------|
| HQ Frame | 1,53681 | 100% | 0% |
| Stitching glue | 0,084 | 0% | 0% |
| Filter Media | 0,76478 | 0% | 0% |
| Sewing thread | 0,15385 | 0% | 0% |
| TOTAL | 2,54 | 0% | 0% |
| Packaging materials | Weight, kg | Weight-% (versus the product) | Recycled materials, weight % |
| Box | 0,32 | 13% | 70% |
| Filter label | 0,0005 | 0% | 0% |
| Box label | 0,0020 | 0% | 0% |
| TOTAL | 0,7224 | | |

Results of the environmental performance indicators



Mandatory impact category indicators according to EN 15804

| HQ55A8-6 | | | A1A2A3 | A4 | A5 | B1 | B6 | C1 | C2 | C3 | C4 | D |
|---|---------------------|-------------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Impact category | Indicator | Unit | Amount | Amount | Amount | Amount | Amount | Amount | Amount | Amount | Amount | Amount |
| Acidification | AP | mol H+-Eq | 6.43E+01 | 2.31E-02 | 0.00E+00 | 0.00E+00 | 1.53E+00 | 0.00E+00 | 6.11E-03 | 7.00E-04 | 0.00E+00 | 0.00E+00 |
| Climate change | GWP-total | kg CO2-Eq | 5.16E+03 | 1.42E+00 | 0.00E+00 | 0.00E+00 | 3.03E+02 | 0.00E+00 | 1.16E+00 | 1.25E+00 | 0.00E+00 | 0.00E+00 |
| Climate change: biogenic | GWP-biogenic | kg CO2-Eq | 1.13E+02 | 2.30E-04 | 0.00E+00 | 0.00E+00 | 6.78E-01 | 0.00E+00 | 7.98E-05 | 4.54E-05 | 0.00E+00 | 0.00E+00 |
| Climate change: fossil | GWP-fossil | kg CO2-Eq | 4.71E+03 | 1.42E+00 | 0.00E+00 | 0.00E+00 | 3.01E+02 | 0.00E+00 | 1.16E+00 | 1.25E+00 | 0.00E+00 | 0.00E+00 |
| Climate change: land use and land use change | GWP-luluc | kg CO2-Eq | 3.43E+02 | 6.50E-04 | 0.00E+00 | 0.00E+00 | 9.32E-01 | 0.00E+00 | 1.10E-04 | 2.14E-05 | 0.00E+00 | 0.00E+00 |
| Energy resources: non-renewable | ADP-fossil | MJ, net calorific value | 5.05E+04 | 1.86E+01 | 0.00E+00 | 0.00E+00 | 7.12E+03 | 0.00E+00 | 1.50E+01 | 8.49E-01 | 0.00E+00 | 0.00E+00 |
| Eutrophication: freshwater | EP-freshwater | kg P-Eq | 3.72E+00 | 7.77E-05 | 0.00E+00 | 0.00E+00 | 2.69E-01 | 0.00E+00 | 2.17E-05 | 1.10E-04 | 0.00E+00 | 0.00E+00 |
| Eutrophication: marine | EP-marine | kg N-Eq | 8.93E+01 | 5.84E-03 | 0.00E+00 | 0.00E+00 | 2.66E-01 | 0.00E+00 | 2.65E-03 | 3.80E-04 | 0.00E+00 | 0.00E+00 |
| Eutrophication: terrestrial | EP-terrestrial | mol N-Eq | 2.43E+02 | 6.47E-02 | 0.00E+00 | 0.00E+00 | 2.31E+00 | 0.00E+00 | 2.91E-02 | 3.30E-03 | 0.00E+00 | 0.00E+00 |
| Material resources: metals/minerals | ADP-minerals&metals | kg Sb-Eq | 2.55E-02 | 3.50E-06 | 0.00E+00 | 0.00E+00 | 6.70E-04 | 0.00E+00 | 7.62E-07 | 2.46E-07 | 0.00E+00 | 0.00E+00 |
| Ozone depletion | ODP | kg CFC-11-Eq | 4.41E-05 | 2.31E-08 | 0.00E+00 | 0.00E+00 | 5.22E-06 | 0.00E+00 | 1.78E-08 | 1.55E-09 | 0.00E+00 | 0.00E+00 |
| Photochemical oxidant formation: human health | POCP | kg NMVOC-Eq | 4.60E-04 | 6.73E-08 | 0.00E+00 | 0.00E+00 | 5.36E-06 | 0.00E+00 | 1.50E-07 | 6.48E-09 | 0.00E+00 | 0.00E+00 |
| Water use | WDP | m3 world Eq deprived | 1.86E+01 | 1.88E-02 | 0.00E+00 | 0.00E+00 | 7.67E-01 | 0.00E+00 | 1.16E-02 | 8.70E-04 | 0.00E+00 | 0.00E+00 |

Additional mandatory and voluntary impact category indicators

| HQ55A8-6 | | A1A2A3 | A4 | A5 | B1 | B6 | C1 | C2 | C3 | C4 | D |
|--|-------------------|----------|----------|----------|-----------|----------|----------|----------|----------|----------|--------|
| Impact category | Unit | Amount | Amount | Amount | Amount | Amount | Amount | Amount | Amount | Amount | Amount |
| Ecotoxicity: freshwater | CTUe | 1.76E+05 | 4.49E+00 | 0.00E+00 | 0.00E+00 | 9.16E+02 | 0.00E+00 | 1.31E+00 | 4.53E+00 | 0.00E+00 | 0 |
| Ecotoxicity: freshwater, inorganics | CTUe | 1.50E+04 | 2.56E+00 | 0.00E+00 | 0.00E+00 | 6.70E+02 | 0.00E+00 | 8.27E-01 | 4.37E+00 | 0.00E+00 | 0 |
| Ecotoxicity: freshwater, organics | CTUe | 1.61E+05 | 1.93E+00 | 0.00E+00 | 0.00E+00 | 2.47E+02 | 0.00E+00 | 4.83E-01 | 1.63E-01 | 0.00E+00 | 0 |
| Human toxicity: carcinogenic | CTUh | 1.11E-05 | 7.86E-09 | 0.00E+00 | 0.00E+00 | 6.13E-07 | 0.00E+00 | 1.74E-09 | 1.21E-09 | 0.00E+00 | 0 |
| Human toxicity: carcinogenic, inorganics | CTUh | 2.71E-07 | 1.71E-10 | 0.00E+00 | 0.00E+00 | 3.83E-08 | 0.00E+00 | 2.99E-11 | 5.05E-10 | 0.00E+00 | 0 |
| Human toxicity: carcinogenic, organics | CTUh | 1.08E-05 | 7.69E-09 | 0.00E+00 | 0.00E+00 | 5.74E-07 | 0.00E+00 | 1.71E-09 | 7.01E-10 | 0.00E+00 | 0 |
| Human toxicity: non-carcinogenic | CTUh | 7.68E-05 | 8.54E-09 | 0.00E+00 | 0.00E+00 | 2.71E-06 | 0.00E+00 | 2.41E-09 | 1.39E-08 | 0.00E+00 | 0 |
| Human toxicity: non-carcinogenic, inorganics | CTUh | 5.75E-05 | 7.84E-09 | 0.00E+00 | 0.00E+00 | 2.64E-06 | 0.00E+00 | 1.86E-09 | 1.38E-08 | 0.00E+00 | 0 |
| Human toxicity: non-carcinogenic, organics | CTUh | 1.94E-05 | 6.94E-10 | 0.00E+00 | 0.00E+00 | 6.90E-08 | 0.00E+00 | 5.52E-10 | 3.24E-11 | 0.00E+00 | 0 |
| Ionising radiation: human health | kBq U235-Eq | 3.31E+02 | 1.91E-02 | 0.00E+00 | 0.00E+00 | 1.99E+02 | 0.00E+00 | 4.69E-03 | 1.95E-03 | 0.00E+00 | 0 |
| Land use | dimensionless | 1.77E+05 | 5.79E+00 | 0.00E+00 | 0.00E+00 | 1.21E+03 | 0.00E+00 | 1.71E+00 | 4.53E-01 | 0.00E+00 | 0 |
| Particulate matter formation | disease incidence | 1.09E+05 | 7.59E-02 | 0.00E+00 | 0.00E+00 | 1.84E+02 | 0.00E+00 | 2.47E-02 | 1.64E-01 | 0.00E+00 | 0 |
| Particulate Matter emissions potential (PM) | disease incidence | | | | -1.70E-05 | | | | | | |

Additional environmental information



Use of the Product

HQ55 user information

Instructions and Support

Comprehensive instructions for the installation, use, and maintenance of our filters are readily available on our website. These resources include detailed guides, instructional videos, and troubleshooting tips to help you maximize the efficiency and longevity of your filter. Our website also features a dedicated customer support section, where you can access FAQs, contact our support team, or download product manuals. We encourage users to regularly consult these resources to ensure the optimal performance of their filtration systems.

Filter Lifetime and Efficiency

Our filters are built to last, with a typical operational life that exceeds industry standards. Depending on the environment and usage conditions, the filter can remain effective for up to 12 months before replacement is necessary. The extended lifetime of our filters reduces the frequency of replacements, contributing to lower overall costs and reduced environmental impact. To maximize the lifespan of the filter, we recommend regular inspections and adherence to the maintenance guidelines provided in our online resources.

End-of-Life Management

We are committed to ensuring that our products have a minimal environmental impact, even at the end of their useful life. Our filters are designed with end-of-life considerations in mind, making them easy to disassemble for recycling. The materials used in our filters, including the frame and filter media, are

recyclable where facilities exist. We provide clear instructions on our website for the proper disposal and recycling of used filters, and we are continually working to expand our recycling program to make it even easier for our customers to participate in sustainable practices.

Sustainability Initiatives

Sustainability is at the core of our product design and manufacturing processes. We prioritize the use of environmentally friendly materials and have optimized our production processes to minimize waste and energy consumption. Our filters are produced using methods that reduce carbon emissions and water usage, and we are constantly exploring new ways to improve our sustainability performance. Additionally, by extending the lifetime of our filters, we help reduce the frequency of replacements, leading to less waste and a lower environmental footprint over time.

At AFPRO, we understand the significance of clean air. We are committed to protecting the safety and improving the well-being of students, employees, and patients in indoor environments such as schools, offices, factories, and hospitals. We strive to develop innovative air filtration solutions that extend lives, protect critical environments and production processes, and meet our customers' most demanding air purification requirements.

We are very proud of our commitment to Corporate Social Responsibility, which goes beyond our day-to-day activities and touches every facet of our business. We actively align our values and actions to contribute to a more sustainable future by incorporating sustainable practices, promoting social well-being, and making informed choices to minimize our environmental footprint.

Together, let's create a world that is safer, healthier and more productive, one breath at a time.