HydroShield™

Performance Enhancement for Gas Turbines

Depth-Loading Membrane HEPA/EPA Filters

AAF INTERNATIONAL®

BETTER AIR IS OUR BUSINESS®

GAS TURBINE SOLUTIONS

HEPA filter technology. Leading-edge results from the world leader.

AAF HEPA/EPA filters help gas turbines realize greater power, enhanced efficiency and extended time between water washes, even in the harshest conditions on earth. Right now, more than 40,000 AAF HEPA/EPA filters are hard at work supplying clean air at reliable differential pressure to gas turbines around the globe, including over 50 advance F-class machines.

Recover lost power

With an initial filtration efficiency of 99.5% or greater at the smallest penetrating particle size, AAF HEPA/EPA filters help maintain gas compressor cleanliness by recovering 6% of the power output normally lost to engine fouling in non-power loss megawatt hours (Mw/hrs).

Increase machine availability

The advanced filtration of AAF HEPA/EPA filters helps engine cores remain in close to new condition during operation. As a result, cycles between on- or offline cleaning can exceed 8,000 hours. More time online means greater productivity.

Enhancing fuel efficiency

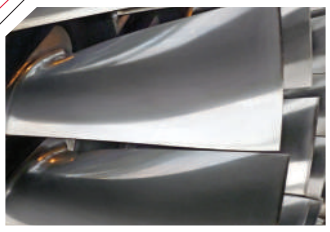
Today's modern gas turbines have incredibly tight tolerances and critical profiles for maximum efficiency. AAF's advanced filtration removes airborne pollution that can foul the engine compressor stator and rotor blades, helping gas turbines run with like-new efficiency even after extensive operation.

Longest engine life—setting world records

The protection offered by AAF HEPA/EPA technology keeps engines so clean, operators can enjoy substantially longer component life and engine reliability. In fact, a record 84,000 hours hot gas path section life has been logged on one engine using AAF protection from aggressive salt ingestion.

Operating Cost Benefits:

- Recover lost power
- Less fuel cost
- Easy retrofit
- Constant power output
- Increased turbine availability
- Less maintenance costs
- Avoid expensive core engine damage



With AAF HEPA (8,000 hours)

Without AAF HEPA (2,000 hours)

Lower Operating Costs with Increased Turbine Reliability

1 | Eliminates compressor fouling

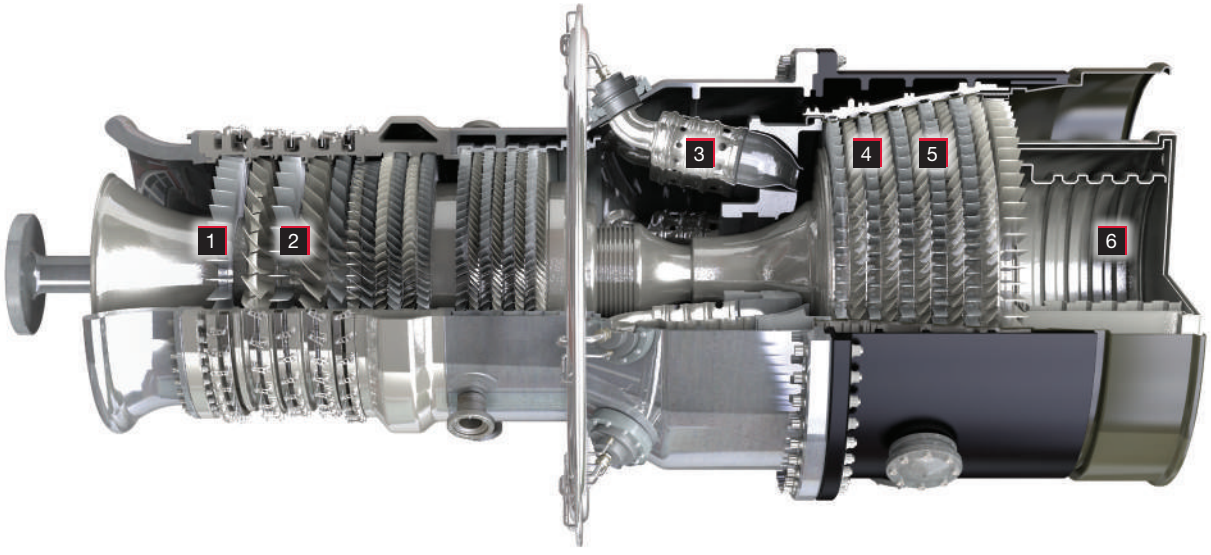
2 | Eliminates or reduces the need for compressor washing

3 | Increased fuel efficiency

4 | Extended lifetime of engine components

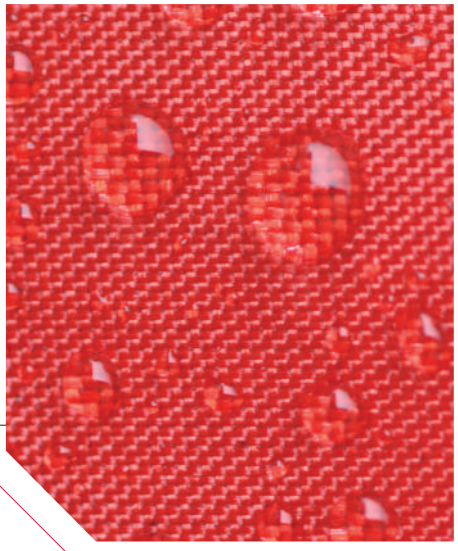
5 | Cooling ports clear of blockage

6 | Constant power output

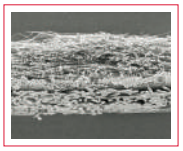


The HydroShield™ advantage

AAF's HydroShield multi-layer composite membrane is designed to offer maximum protection in environments where excessive moisture, salt and hydrocarbons are prevalent.

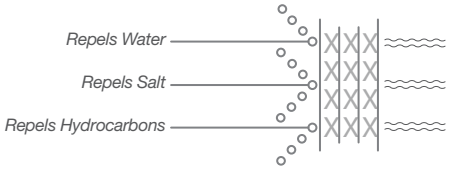


Depth-loading filtration technology



HydroShield employs a specially designed multi-layer media with unique depth-loading membrane technology that acts as a reservoir for oil, hydrocarbon and dust capture. The media has been optimized to offer E12 HEPA efficiency grades.

Unlike many comparable filters, HydroShield's depth-loading membranes resist the "wetting" that is prevalent in PTFE media, a process in which captured oil binds the membranes together, rapidly increasing differential pressure and reducing useful life.



Water and salt repellent

To properly maintain power and efficiency in even the most arduous conditions, a gas turbine filter must resist not only dust and dirt, but also repeated exposure to fog, moisture and salt spray. To make sure HydroShield filters exceed expectations in any application, AAF created a purpose-built testing facility to simulate the harsh, damp conditions found in coastal and offshore marine locations. By testing seawater resistance in a variety of applications, AAF has been able to create a barrier that can deliver consistently excellent results regardless of the type and quantity of moisture present.

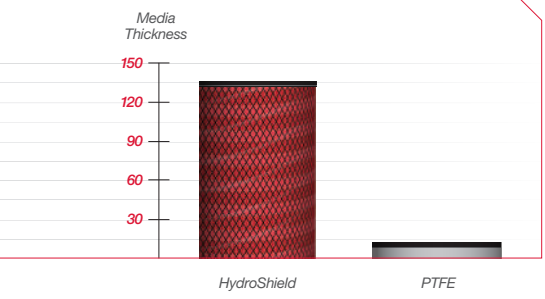
Optimal media pleating

AAF HEPA/EPA filters are perfected down to the last detail. Even the pleating in the filter media has been optimized to ensure low airflow resistance and high dust-holding capacity. The media is uniformly spaced by synthetic glue beads to present a consistent, open structure. The lower stabilized pressure drop this creates will recover power and save fuel, while the open-pleat geometry protects against media bridging during excessive moisture exposure.

Lower, stabilized pressure drop

Depth-loading media results in a lower initial pressure drop coupled with better dust capture and distribution during operation. This lower pressure loss reduces associated energy costs through fuel savings.

Depth-Loading Reservoir:



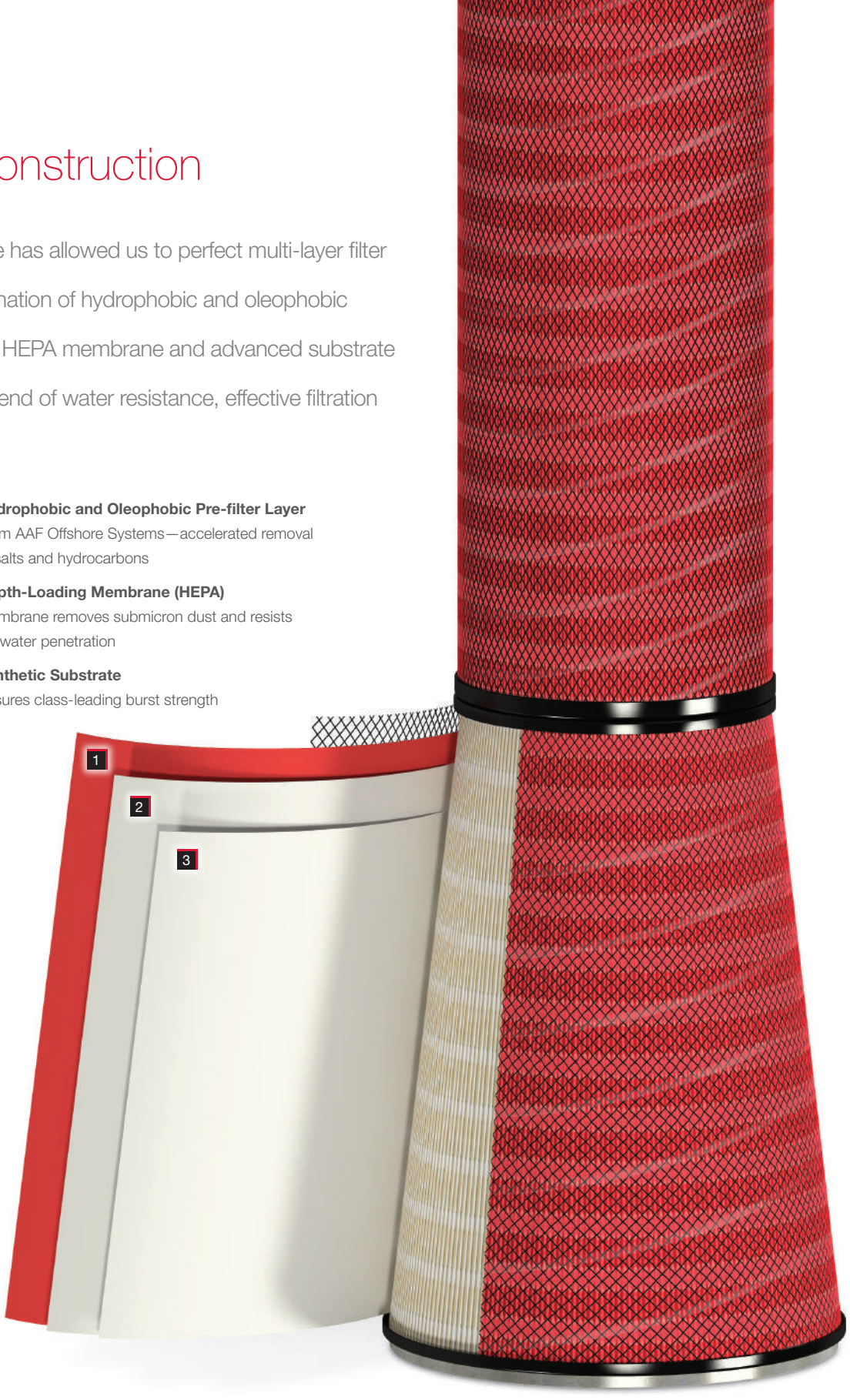
Multi-layer construction

AAF's extensive expertise has allowed us to perfect multi-layer filter construction. The combination of hydrophobic and oleophobic pre-filters, depth-loading HEPA membrane and advanced substrate creates an unbeatable blend of water resistance, effective filtration and innate strength.

1 | **Hydrophobic and Oleophobic Pre-filter Layer**
From AAF Offshore Systems—accelerated removal of salts and hydrocarbons

2 | **Depth-Loading Membrane (HEPA)**
Membrane removes submicron dust and resists saltwater penetration

3 | **Synthetic Substrate**
Ensures class-leading burst strength



Elements available for use in the following inlet systems:

| Donaldson | Braden | Camfil Farr | Pnuemafil | R&M | VAW | Others

Performance

Our mission is simple: Make clean-air HEPA technology as effective and economical as possible.

A pre-filter removes hydrocarbons and oil particles from the air before they reach internal turbine components.

Product accessories

AAF is a provider of filters to some of the world's largest turbine manufacturers and operators. AAF has a comprehensive range of HEPA products and associated pre-filter and coalescer technologies as diverse as the challenges presented to them.

This has allowed AAF to develop class-leading, modular filters that allow most filter systems to have air quality upgraded simply by selecting a new filter type. AAF will work as your clean air partner to establish a filter system that will deliver enhanced air quality, longer equipment life and decreased pressure loss for your exact equipment. And your exact needs.

Our entire product range is certified to international and original equipment manufacturers' (OEM) standards, ensuring proper protection and total peace of mind. Our investment in Field Simulation Equipment (FSE) allows us to model your existing and future operations in the laboratory and on-site to fine-tune and improve engine performance year after year.

Partnering with AAF provides many advantages

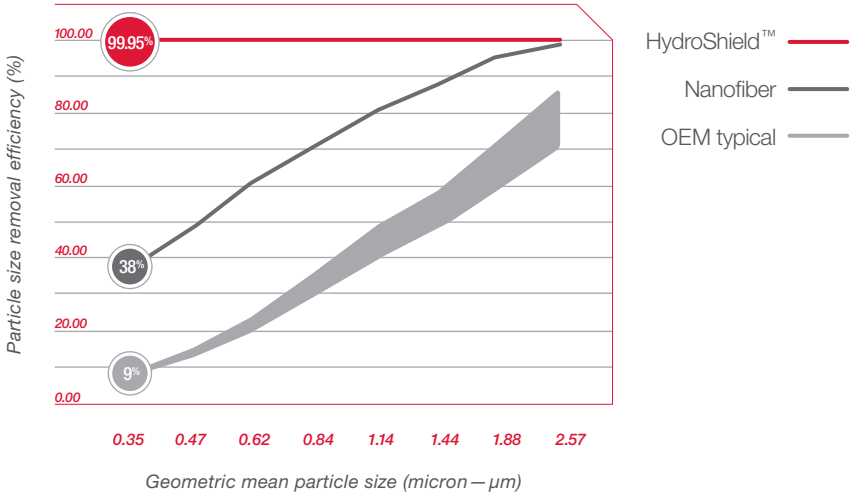
- Air quality management program
- Quarterly GT efficiency reporting
- Access to client-specific, custom R&D
- Equipment health check
- Removal, fit, commission and disposal services

Technical features

As leaders in the development of premium-quality HEPA and conventional 98 grade static filters for the arduous offshore and tropical environments, AAF brings the extent of our salt and water filtration research and experience together in our latest marine performance canister.

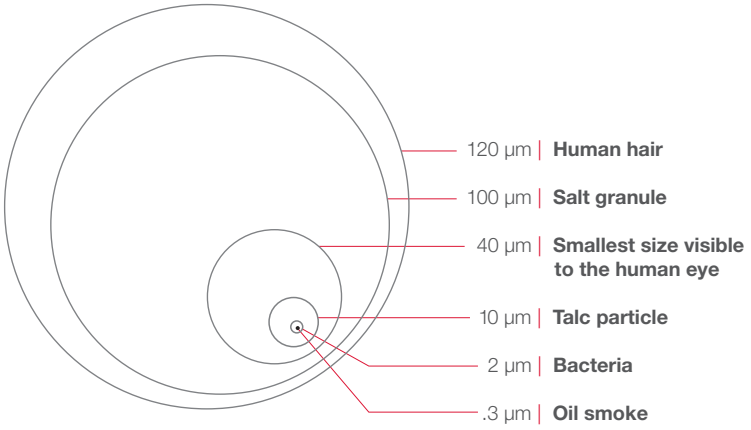
HydroShield filters outperform nanofiber media and any standard filter, particularly when it comes to capturing submicron oil mist that can penetrate critical engine components and disrupt operation.

Filtration Efficiency Comparison



HydroShield's depth-loading membrane is designed to capture submicron particles that can get past other filters. One micron (micrometer) is one millionth of a meter or approximately 1/25,000 of an inch. As this diagram illustrates, a human hair is around 120 microns thick.

Small Particles in Perspective



AAF HydroShield depth-loading, HEPA cartridges are not designed for pulsing.

Quality, expertise and innovation

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AAF has a policy of continuous product research and improvement and reserves the right to change design and specifications without notice.