

BALDWIN FUEL FILTERS

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Baldwin offers superior protection against dirty fuel

Dirty fuel is a fact of life. Even with the development of cleaner-burning fuels, contaminants are still a major concern when it comes to fuel systems.

- No. 2 diesel fuel is one of today's most variable fuel sources. Its quality and purity range unpredictably from very good to very poor.
- Current API specifications allow "acceptable" levels of impurities (sulfur and wax) and contaminants (dirt, ash and water). It's likely that these regulations will weaken even further in the future.

The deterioration of fuel is inevitable. Contaminants are introduced into the fuel system through mixing, transferring, and storage.

Baldwin Filters has a full line of fuel filters to protect today's engines from contaminants. With spin-ons, elements, fuel managers and fuel/water separators, Baldwin has the filter to fit most applications.

In addition, the DAHL/Baldwin fuel/water separators offer an additional line of defense for applications where significant amounts of water need to be removed. DAHL fuel/water separators feature a unique, patented depressurizer cone that spreads the flow of fuel, allowing greater separation of water and dirt from fuel.





Baldwin: The Basics of Fuel Filtration

Micro-organisms can quickly become major problems. Colonies of fungus and bacteria, both aerobic and anaerobic, feed on your fuel. Commonly known as humbugs, they spread rapidly in the presence of moisture. They ride along with the fuel, easily pumped from one tank to another.



As the micro-organisms accumulate, they will spread through the fuel system and quickly plug the fuel filter. A coating of slime will develop over the entire surface of the media. Chemical treatment with a biocide is the only effective solution to the problem of bacterial and fungal growth.

Contaminants arrive in your fuel in two forms — precipitates and particulates.

Precipitates are non-combustible materials formed when fuel oxidizes. They may also form if, as sometimes happens, two incompatible fuels are blended. Significant swings in temperature accelerate the precipitation problem. Because precipitates are generally heavier than fuel, they tend to settle to the bottom of tanks. Decanting or carefully drawing off the fuel will leave the precipitates behind.

Particulates, sometimes called “asphaltines,” are black, tar-like contaminants. A residue of the refining process, particulates plug filters quickly. There is no known chemical treatment for the removal of these contaminants.

Wax, in moderation, is a desirable fuel component — it adds energy to the fuel. In operation during cold weather, however, control of wax becomes necessary, usually by applying additives or changing to a higher grade of diesel fuel. Like water, wax begins to thicken at colder temperatures. As wax gels, it can restrict and eventually stop fuel flow. Wax thickening involves a couple of critical temperature points:

- **Cloud point** — the temperature at which solid crystals of wax begin to form — the fuel looks opaque, but it still flows.
- **Pour point** — the temperature at which the gel forms — the fuel cannot be poured.

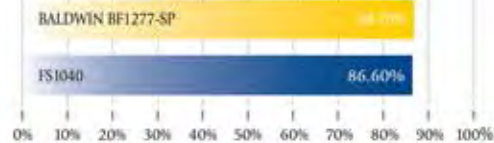
PURE PERFORMANCE: TESTED TIME & AGAIN

Pure Performance: tested time & again

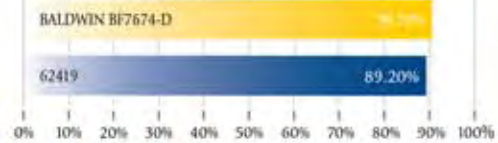
SAE J905 is an industry standard filtration performance test for determining the contaminant removal efficiency and contaminant holding capacity.

Baldwin fuel filters mean pure performance, system protection and hours of trouble-free operation for all types of equipment.

CONTAMINANT REMOVAL EFFICIENCY



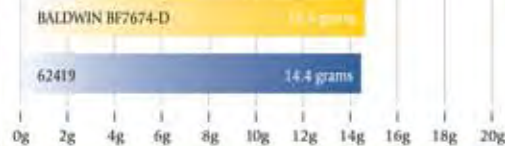
CONTAMINANT REMOVAL EFFICIENCY



CONTAMINANT HOLDING CAPACITY



CONTAMINANT HOLDING CAPACITY



Dirty fuel can rob you blind.

You know that a restrictive fuel filter has immediate effects on engine performance - none of them good.

And while you don't regularly anticipate fuel filter plugging, problems can be noticed immediately in loss of power. This is why proper maintenance is essential for maximum engine performance.

Fuel filters usually come in pairs, primary and secondary. Some systems operate with only a single filter and certain other systems depend on a fuel filter and an optional fuel/water separator.

Primary fuel filters are:

- more open, built to capture only large contaminants.
- less restrictive.
- designed to protect the transfer pump from abrasives.
- mounted on the vacuum side.

Secondary fuel filters are:

- tighter, built to capture small contaminants.
- designed to protect the injection pump from the very fine abrasives that would otherwise damage sensitive injection equipment.
- mounted on the pressure side, usually pressurized to 20 to 60 psi.



Fuel Filters Protect Against Contaminants

Potentially the most damaging of the contaminants, water destroys the lubricative properties of fuel. With lost lubricity, the fuel can scour pumps and even blow out injector tips. At colder temperatures, water in the fuel can freeze and contribute to total fuel stoppage.

The good news is, water can be removed from fuel — within limits. There are three common mechanisms for water removal:

- **Stripping.** A silicon-treated medium inhibits the passage of water, but allows fuel to flow freely.
- **Coalescing.** Gravity drags water droplets (heavier than fuel) out of slow-flowing fuel.
- **Absorption.** A filter medium with a high affinity for water and a low affinity for fuel absorbs the water in the fuel.

Some OEMs use fuel/water separators relying on a stripping mechanism. Several difficulties occur with these separators:

- Plastic bowl separators are subject to road hazards and chemical attacks, resulting in cracks and leaks.
- Replacement bowls are not easily available, and the replacement process is difficult, increasing costs and downtime.
- The configuration of the plastic bowl creates an additional path for leaks.



PHOTO PROVIDED BY ROBERT BOSCH CORPORATION



Baldwin filters designed to perform

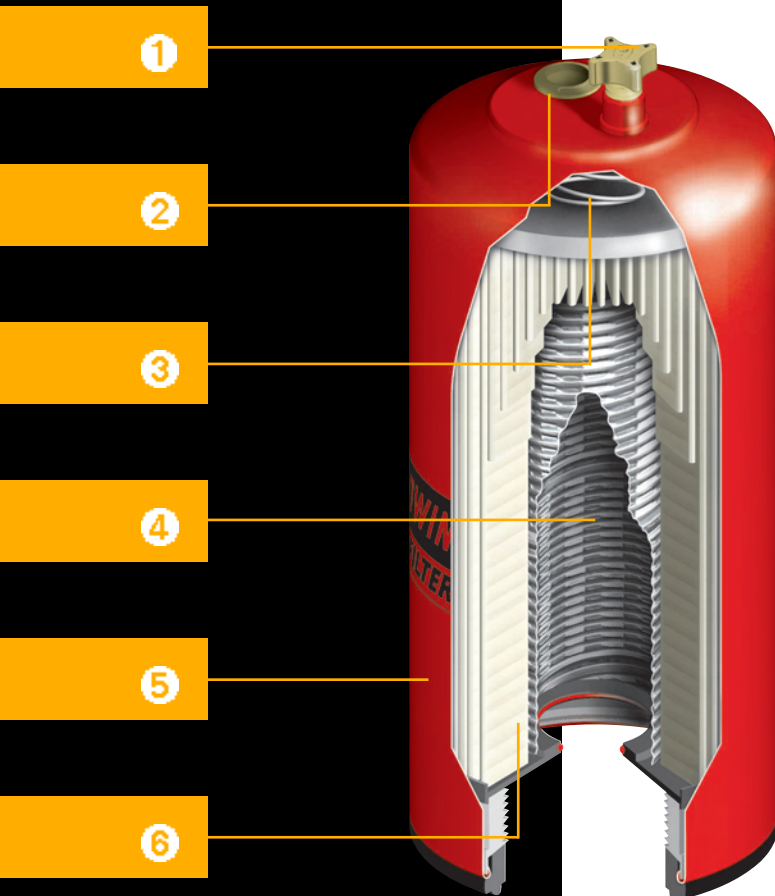
Baldwin filters have been designed and tested to perform according to structural specifications for:

- varied service environments.
- expected service life.
- flow requirements.
- working and maximum pressures.
- surges and fluctuations of pressure.

Baldwin filters have been tested against the constraints of SAE J905, the official standard for determining fuel filter performance. These SAE specifications address the principal determinants of on-the-job performance:

- efficiency in removal of contaminants.
- capacity for removal of contaminants (as measured in holding capability of the media over the desired change interval).
- ability to meet needed flow rates for fuel.

Tank after tank, Baldwin helps your fuel flow freely. Dirty fuel can sap your engine's power and drain its longevity. Baldwin fuel filters protect your engine from the harmful effects of water and contaminants in fuel. Baldwin filters will pay for themselves many times over in increased engine performance and longer engine life.



- 1 **All-Metal, Self-Venting Drain** eliminates the need to separately vent the fuel system prior to draining, while adding superior structural strength and ease of service.
- 2 **Sensor Port Connection** accepts the OEM sensor.
- 3 **Steel Coil Spring** keeps its shape, maintaining a positive load pressure on the adapter seal.
- 4 **Spiral Wound Louvered Centertube** with fluted ribs allows for maximum flow and adds strength to resist pressure surges.
- 5 **Heavy-Duty, All-Metal Housing** provides unequalled burst- and pulse-withstanding strength.
- 6 **High Efficiency HydroShield™ Media** was developed to repel water while maximizing strength, efficiency and contaminant capacity.

Quality Fuel Manager Style Replacements

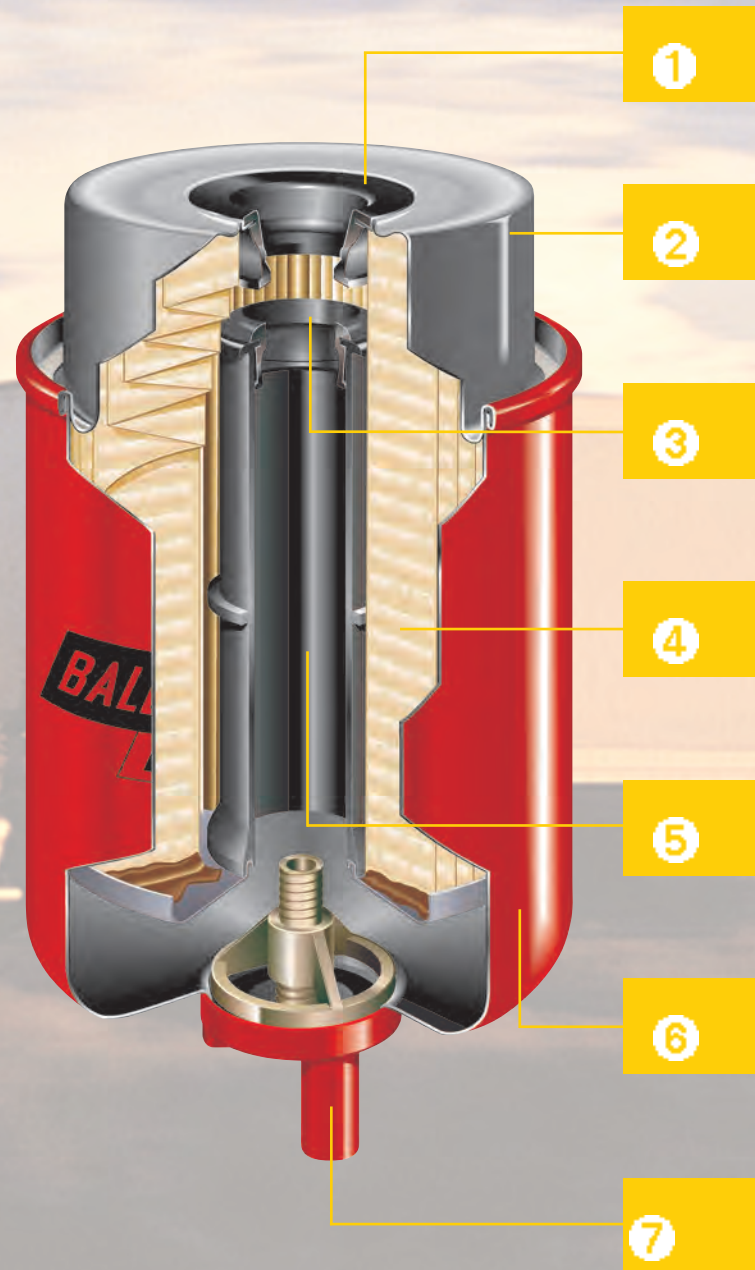
Baldwin Filters' design incorporates a removable, all-metal, self-venting drain valve into the filter's assembly for full compatibility with OE designs. All OE drain valves, sensors and bowls may be used with the new Baldwin design. These filters provide the performance expected of Baldwin designed products.

With today's high performance engines, proper fuel filtration is more important than ever. Every day, contaminants, in varying amounts, are introduced into fuel storage systems through mixing, transferring and storing by the consumer, the supplier and their sources.

These contaminants can interfere with vital engine components and can quickly affect engine performance.

The deterioration of fuel is inevitable, but it doesn't have to stop your engine from running. With Baldwin filters, you can minimize downtime and maximize engine performance.

- 1 **Pliable Elastomeric Outer Seal** incorporates a dual seal design to provide enhanced seal performance.
- 2 **Raised Keys** eliminated for universal fit on multiple fuel bases.
- 3 **Pliable Elastomeric Internal Seal** replaces hard plastic material to provide a positive sealing surface.
- 4 **Highly Effective HydroShield™ Media** repels water and other contaminants, while assisting in the removal of water from the fuel.
- 5 **Centertube** helps prevent collapse caused by a sudden difference between internal and external pressure.
- 6 **Heavy-Duty, All-Metal Housing** provides unequalled burst- and pulse-withstanding strength and eliminates risk of plastic failure.
- 7 **Removable, All-Metal, Self-Venting Drain Valve** adds versatility for universal fit with OE bowls and sensors.



Baldwin Filters...known for Quality!



Baldwin is the industry leader in heavy-duty filters. Our multi-million dollar research and testing facility anticipates an ever-increasing demand for filters that meet or exceed original equipment specifications.



Long before the industry adopted the philosophy, Total Quality Management guided our manufacturing and distribution processes. Baldwin continues to earn preferred vendor status, such as the QS 9000 and ISO 9001 certification.



We're committed to giving our customers the best products and services in the filter marketplace. It's a commitment based on continued engineering of our production facilities, ongoing training of our employees, and refinement of already sophisticated research operations.



BALDWIN FILTERS® 

a CLARCOR company

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