

The Real Story on Automotive Filters

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Early automotive engines didn't use any kind of filtration for the oil. It wasn't until a patent was granted to Ernest Sweetland and George Greenhalgh in 1923 for their product the "pure oil later" or "Purolator," that you could buy an automobile with a full pressure lubrication system.

It would be many years later before a full flow oil filter found on today's automobiles was incorporated.

The 1940s would bring about filtration systems on mass produced vehicles, and the 1960s made oil filter changes much more convenient with the advent of "spin on" disposable filters. Through the next few decades, advances were made in the internal construction and filter media, making the filters much more efficient. Today, all automotive engines, whether gasoline or diesel, come with filtration designed to improve oil cleanliness and thus extend the life of that engine.

What makes today's filters better than those of the past is the filter media itself. Early designs incorporated steel wool, wire meshes, metal screens and more to keep the particles from entering the system. The next iteration of the media was in the form of bulk cotton or various woven fabrics, like linen. When disposable filters became popular in the 1960s, cellulose and paper were used to minimize production costs. Although cellulose and paper filters still can be purchased today, a better technology exists: synthetic media.

Today's filters are made of cellulose or synthetic media encompassed in a steel can. The top of the filter has a threaded center hole with smaller holes surrounding it. Oil will enter through the surrounding holes, pass through the media and exit the threaded center. The can typically screws directly to the engine block and uses an O-ring gasket to prevent leakage. Some filters will also have a drain back valve at the smaller surrounding holes to prevent dirt and debris that is trapped on the face of the media from washing back into the system during depressurization. There is also a pressure relief or bypass valve that allows the oil to bypass the media in the event that it becomes plugged or the pressure differential becomes too high.

A good filter has a strong steel can to withstand the high oil pressure (60-80psi when cold), an anti-drain back valve that works without creating too much back pressure, a pressure relief valve that doesn't leak below its opening pressure, and a strong element and cap that can withstand the pressure and flow of oil without falling apart.

The element media has to be able to trap small particles, but not restrict the flow too much. Cellulose is used on economy filters. The fibers in the paper act as a mesh to block particles while still allowing the oil to pass through. Some manufacturers add other media, such as cotton, to the cellulose to improve its performance. Also, there is synthetic fiber media for the high-end filters that has smaller passages to trap smaller particles, but can also pass more fluid through because it has more passages, thus increasing the inherent surface area.

There is also media that is a blend of the two. Not only does the type of media play a role in the filters ability to remove debris, but also the construction. Depth filters are usually made of a synthetic

material that has a passage size gradient to it. In other words, the deeper into the element the oil goes, the smaller the passages get. This way, large particles are trapped on the surface and small particles get trapped deeper within, allowing the filter to hold more particles before it becomes too restrictive.

So how do you know which ones to buy? A large portion of all passenger car oil filters are sold to do-it-yourself oil changers. Last year, that accounted for 189 million oil filter changes. Cost plays a major role in deciding what oil filter to purchase. The cost of a synthetic depth filter is almost double of that of the cellulose filter. It may only cost a few extra dollars in the beginning, but there have been multiple case studies on the effect of the cleanliness of the oil affecting component life to the tune of three to four times the life extension of the engine. Ask yourself the next time you are standing in front of a store shelf full of engine oil filters ... “Is it worth a few extra dollars to me now to save an expensive rebuild down the road?”