TECHNICAL FEATURE

What happens if the oil filter is never replaced?

Why does the oil filter, an apparently ordinary component, become the 'main character' whenever maintenance is carried out? How do thousands of driving miles affect it? UFI, a global leader in filtration and thermal management solutions as well as green hydrogen technologies, explains the life cycle of the oil filter – from new to 30,000 kilometres on the road.

0 KM: BRAND NEW

In a newly replaced oil filter, the structure of the filter paper and the internal components are in the same condition as when they left the production line. Inside, there is a non-return valve, whose function is to prevent oil from draining out of the filter when the engine is switched off, ensuring a perfect seal. The bypass valve only operates during cold starts, while under normal conditions it remains closed.

When oil passes through the filter, any mechanical impurities and colloids inside can be effectively removed. The oil flows easily through the filtering media, encountering low resistance. This means it reaches components such as the crankshaft and camshaft surfaces precisely, forming a complete film. This creates a contaminant-free lubricating environment for the engine, thereby preventing premature wear of its internal parts.

Internal structure of a new oil filter

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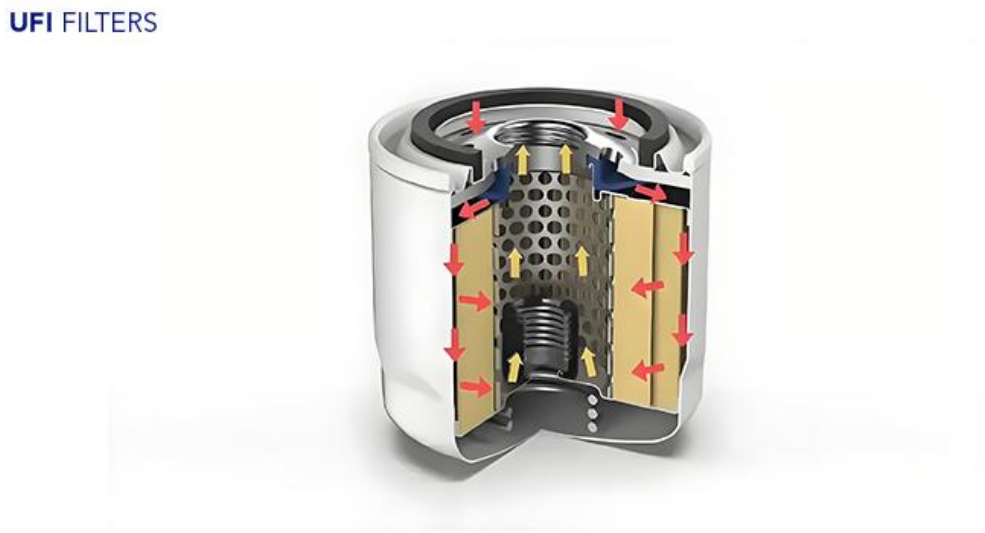

Normal operating status of the oil filter

0 KM–30,000 KM: HIGH-EFFICIENCY OPERATION

As the vehicle's mileage increases, in the oil filter the surface of the filtering media gradually traps impurities such as metal fragments and colloids. During this process, due to the constant absorption of these particles, the filtration pores gradually become blocked. However, filtration efficiency actually 'improves' until it reaches peak performance.

At this stage, the filter can effectively remove impurities from the oil. The bypass valve remains 'inactive', and the oil flow resistance slowly increases while remaining within a safe and controllable range.

OVER 30,000 KM: A CRITICAL PERIOD FOR FAILURES

With further mileage, however, the filtration precision of the oil filter drops significantly. At this stage, the filter media accumulates a large number of impurities, and oil flow resistance increases considerably. The bypass valve starts to activate occasionally, allowing unfiltered oil to flow directly into the engine, causing serious wear to its internal components. With prolonged use, the non-return valve tends to lose its elasticity, reducing its hydraulic seal. This phenomenon causes oil to return to the sump, resulting in the filter being emptied.

When starting the engine, the oil hydraulic circuit also takes longer to reach operating pressure, leading to non-continuous or delayed lubrication of mechanical parts. This accelerates component wear and increases the risk of overheating and potential engine damage.

At this stage, the only thing to do is to replace both the oil and the filter promptly, to ensure the proper functioning of the vehicle.

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Severely clogged oil filter

NEXT STAGE: BREAKDOWN FAILURES

What happens if the oil filter is not replaced when necessary? If it is not changed, the internal filtering media can become damaged or collapse. The filtration effect becomes virtually nil, and unfiltered oil flows straight into the engine, with serious consequences for all lubricated components.

For example, lubrication with unfiltered oil can have an abrasive effect on the walls of the combustion chamber. This allows oil to enter the combustion chamber and causes blue smoke to be emitted from the exhaust. Maintenance costs will rise significantly. In mild cases, replacing the piston rings and regrinding the cylinder might be enough, though costly; while in more serious cases the engine may need to be replaced.

Oil filter completely blocked

UFI'S RECOMMENDATIONS

Regular maintenance and replacement of the oil filter are essential, not only to effectively extend the engine's lifespan but also to ensure driving safety.

When replacing the oil filter, it is crucial to choose a reliable brand. Using a poor-quality filter not only fails to achieve the intended filtration effect but also significantly reduces its service life.

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TECHNICAL FEATURE

UFI oil filters feature cutting-edge solutions to keep up with the ever-evolving automotive industry, and to respond appropriately to technological advances such as engine downsizing, the adoption of start-stop systems, the integration of hybrid technologies, and the adoption of Euro 6 and forthcoming Euro 7 engines.

UFI can also boast in-house production of innovative filtering materials, branded **FormulaUFI**. Among other advances, the company has developed a revolutionary filtering media called **FormulaUFI.Micron**, which is based on glass fibres (sometimes mixed with synthetic fibres) to maximise filter lifespan, optimise efficiency and reduce pressure drop. The efficiency of the filter is related to the size and distribution of the fibres: very small fibres increase filtration efficiency, while the gradient size extends the element's service life. Furthermore, in oil modules, UFI uses reinforced plastic, which improves durability and performance. This innovation contributes to the overall efficiency and longevity of the filtration system.

UFI's commitment to innovation includes the use of novel materials for oil filters and multifunctional integration within the modules. This not only reduces weight but also simplifies the design, making the filters more efficient and compact. They are designed to ensure optimal resistance to high operating pressures, thus guaranteeing consistent performance even in tough conditions, as well as providing reliable protection for the engine.

The filtering material used by UFI for its oil filters goes beyond simple filtration – it also ensures the highest engine performance. This is particularly important with the introduction of new, long-life lubricants, additives and oils – both mineral and non-mineral – which can cause lubricant degradation over time.

The structure of UFI's filtering media, both traditional and the innovative **FormulaUFI.Micron**, ensures high permeability. This results in minimal pressure loss within the engine's lubrication system, contributing to overall engine efficiency and longevity.

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UFI is also committed to environmental sustainability, and its filters reflect this commitment. The company's 'green' modules – with no metal parts – are designed for minimal environmental impact, in line with the automotive industry's growing focus on eco-friendliness.

UFI's oil filters are a testament to its commitment to innovation, performance and environmental responsibility, in a constantly evolving automotive landscape.

UFI Filters:

Founded in 1971, UFI is a global leader in filtration and thermal management, and green hydrogen solutions. UFI's technologies are applied in sectors such as automotive, aerospace, marine and industry, through to F1 racing teams and the European space vehicle ExoMars.
UFI supplies air, oil, fuel, cabin, hydraulic and coolant filters, as well as thermal management systems for combustion, electric and hybrid vehicles. A leader in Original Equipment, UFI is chosen by 95% of car, motorbike, heavy-duty (on-road and off-road) and agricultural vehicle manufacturers, supplying brands that account for 50% of global heavy-duty vehicle production. With its UFI and Sofima brands in the Aftermarket, it covers 98% of the European car parc.
With 22 production sites, more than 4,300 employees in 21 countries and 3 Research & Innovation Centres employing over 270 technical specialists, UFI invests more than 5% of its turnover in R&D and holds more than 350 patents, shaping the future with cutting-edge technological solutions.

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