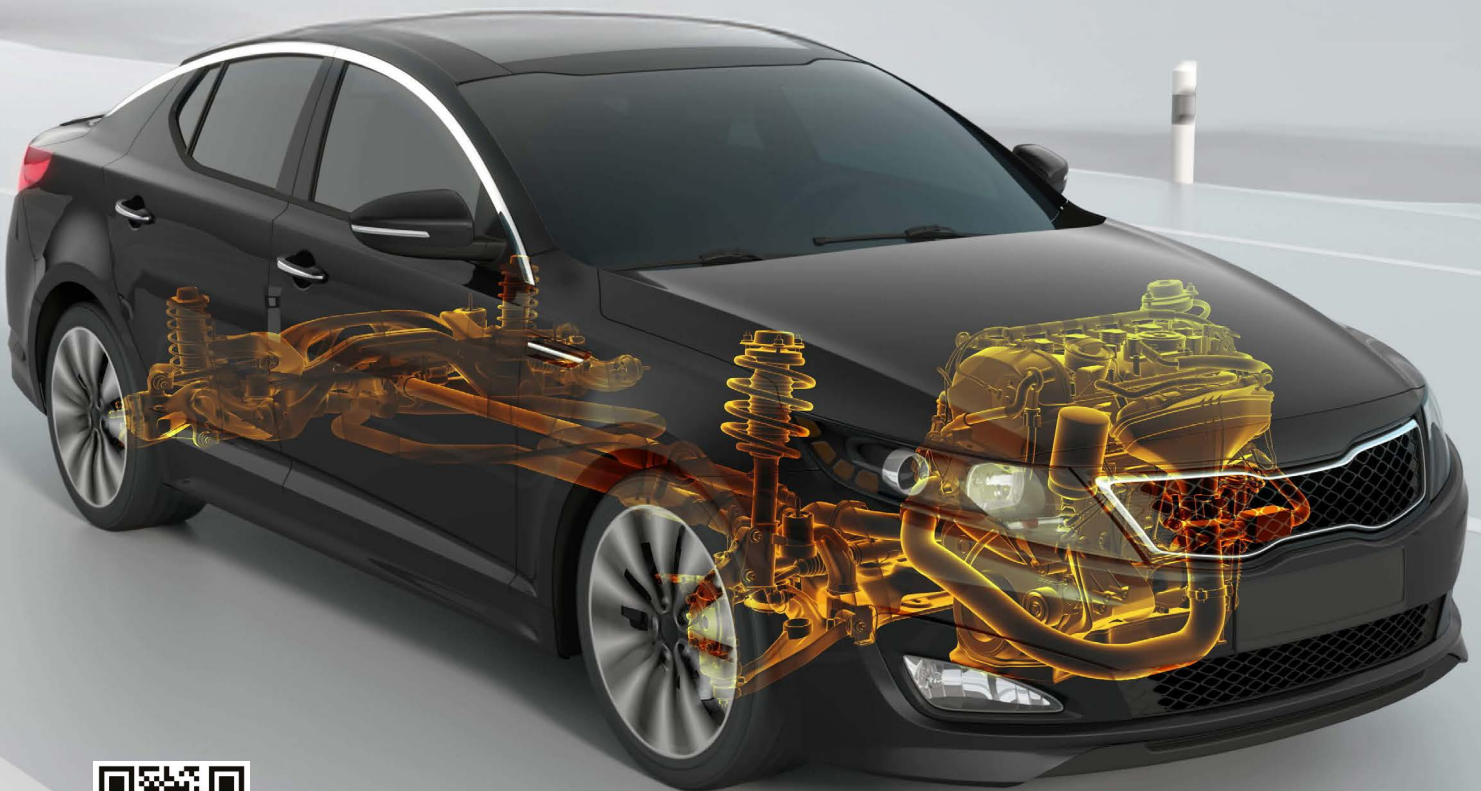


Lube 2025 Digital Exclusive

THE EUROPEAN LUBRICANTS INDUSTRY MAGAZINE

November 2025

The official journal of



Subscribe to Lube Magazine at
www.lube-media.com/subscribe

**Making the shift to
modern ATF**

Making the shift to modern ATF

Adam Banks, ATF Senior Marketing Manager, Afton Chemical

ATF (Automatic Transmission Fluid) has evolved significantly over time, its formulation style reflecting the changing demands of transmission hardware. The launch of GM's (General Motors) landmark DEXRON® – VI fluid specification, which celebrates its 20th birthday this year, heralded a new age of high-performance, low-viscosity ATF. Afton looks at why modern ATF is so vital to the reliability and longevity of today's passenger car transmissions and shares insights into the potential pitfalls of continuing to use outdated specs.

For Europe, automatic transmission penetration in passenger cars has lagged significantly behind that of the US, Japan, Korea and China, despite these regions having achieved similar levels of economic development. This anomaly is attributed to the longstanding desire of European drivers to feel in control of their vehicle, connected to the road and able to choose the right gear to tackle the varied and challenging roads they travel.

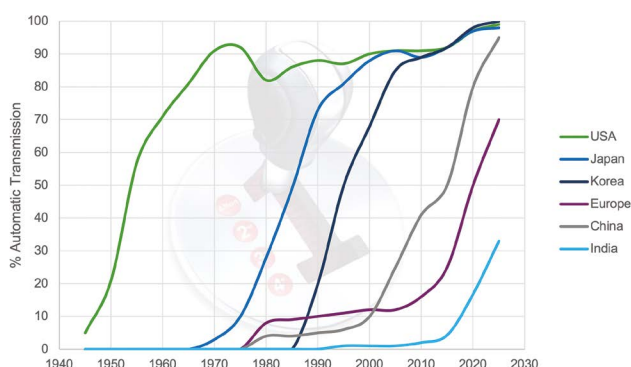


Figure 1: Global penetration of automatics by location

Growth in automatics

This mentality has created no small resistance to adopting automatic transmissions, which were until more recently perceived as leaving a driver divorced from the act of driving. Only now in Europe has the proportion of new vehicle sales with automatic transmissions started to approach a level that will soon match these other mature markets. This has been enabled by the advent of DCTs (Dual-Clutch Transmissions), which help to bridge the gap between drivers feeling connected to the road and the convenience of an automatic.

Meanwhile in India, current sales patterns are echoing those seen in Europe around a decade ago with automatic sales now starting to rise steeply.

This growth in automatics is likely to be sustained because once people have switched to an automatic, they generally don't go back to driving a manual. The premium paid for automatic vehicles is also less

now than it used to be, relative to the total value of the car, further cementing this change in consumer behaviour.

Hardware demands

However, the understanding of modern transmission fluid performance also seems to be lagging behind other markets. The European market has remained open to using the 25-year-old DEXRON®-III (H) specification, even in modern transmissions. This openness may stem in part from historic use in commercial vehicles, heavy machinery, hydraulic and power steering applications, as well as passenger cars. Data from Afton Chemical indicates that for years that DEXRON®-III represented half the market volume in Europe, possibly giving the misleading impression that this specification is commonly used in, and therefore still suitable for, today's passenger car transmissions.

In fact, the complex and sensitive automatic transmissions in passenger cars have little in common with those applications. Modern step (Auto-transmissions), DCTs and CVTs (Continuously Variable Transmissions) are all designed differently from those and from each other, and their fluid performance needs differ significantly. The steel-on-steel friction characteristics needed by a CVT pulley and chain are very different to the needs of clutches in ATs and DCTs. Modern transmission fluids are essential for modern transmissions; neither bears a close resemblance to their predecessors.

While the service fill market always lags behind new vehicle sales, the extent of the lag depends on the type of automatic transmission. CVTs and DCTs both have relatively short oil drain intervals: as little as 30,000 kilometres for the former and 60,000 kilometres for the latter, largely driven by the friction needs of the launch clutch. The fluid lifespan for step ATs tends to be longer, over 100,000 kilometres recommended between fluid changes. Typically, that translates into a service fill just once every 7-8 years, although some repair operations may require a fluid change much sooner.

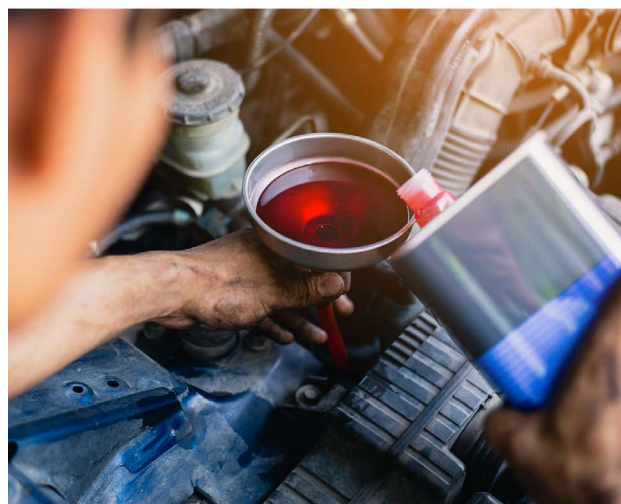
Growing volumes of ATF service fills therefore started around ten years ago in Europe, at a time when the infrastructure to deliver and the understanding of service needs were still being established. Today, the market has reached the point where independent oil companies should be seeing significant demand for

modern ATF. Europe today needs service fluids that support DCTs, step ATs with 6 to 10 speeds, and the smaller volume of CVTs. Given the average age of the European car parc is around 12 years, the majority of vehicles currently on the road will require a modern transmission fluid.

When the groundbreaking DEXRON®-VI specification was released 20 years ago, it ushered in the age of modern ATF. To call this specification old would be to underestimate its stringent performance profile and the fact that it has continued to evolve since its launch. Specifically developed to support the newest GM transmission hardware at that time, which itself was designed and calibrated using the fluid specification, a genuine DEXRON®-VI fluid assures the same performance and reliability as the original factory fill.

DEXRON®-III (H) was based on Group I/II base oils, whereas the DEXRON®-VI specification was designed to be far more refined, based on a higher-quality Group III base oil with an exceptional performance additive package. It demanded a fluid that was more shear-stable and resistant to aeration to maintain an effective lubricant film thickness to protect against wear. A step change in friction control and friction durability was vital to ensure the transmission could transfer power and change gear reliably throughout its lifetime. Improved oxidation resistance, thermal stability and corrosion protection would ensure that the fluid retained this performance as it aged.

GM decided that its newest transmission at the time – the 6-speed HydraMatic – needed to be twice as reliable as its 4-speed predecessor; its fluids team was certain that the only way to deliver this was through a new fluid specification.



Putting DEXRON®-VI fluids in older step automatic transmissions is not a problem as it is fully backward compatible, but what would happen if you put a DEXRON®-III (H) fluid in a modern transmission designed around DEXRON®-VI specification? We put this question to past and present GM fluid engineers Jim Linden, Coleman Jones and Khaled Zreik, and Afton technical specialists Brent Calcut, Mike Glasgow and Tracy McCombs, each with experience working on one or both of these ATF specifications and tests. They all predicted that you might not pick up on this mistake until it was too late; here is why.

Friction control

Modern transmissions need precise and durable friction control. Friction modifier additives smooth engagements, preventing vibration and shudder. But if you use too much, the overall level of friction drops and you lose torque capacity. Lower torque capacity requires more clutches, or more pressure between clutches, to be able to carry the amount of torque the transmission needs to transfer. The DEXRON®-VI specification was innovative in being able to balance those needs: it delivers a smooth friction curve that lasts twice as long and also holds a higher torque capacity. Using DEXRON®-III (H) fluids would likely cause changes in shift feel or poor shifting, although a typical consumer might not pick up on this right away. When clutches experience excess slipping, their cellulose-based materials get damaged; this scenario would require a transmission repair or rebuild.

Shear stability is also critical for the latest hardware. Once the ATF shears down too much, the transmission pump may start struggling to produce enough pressure because its clearances are designed around a specific fluid viscosity. The pump could gradually or suddenly lose efficiency, becoming noisy. Its inability to maintain sufficient fluid pressure would in turn mean the clutches become unable to carry the torque, eventually manifesting in some gears being lost, most likely starting with first to second. A highly shear-thinned fluid could also result in loss of lubricant film thickness, causing greater gear and bearing wear and reducing reliability.

A shorter fluid life, because DEXRON®-III (H) fluids are not as oxidation-resistant or as thermally stable as DEXRON®-VI fluids, also brings challenges for newer transmissions due to their higher power density. This means more heat is transferred into the ATF, which

causes it to break down faster, creating deposits and potentially corrosive oxidation by-products that reduce the life of the transmission.

Any of these potential routes to failure might go undetected for some time as transmission control modules can be adaptable – to an extent. However, the consensus was: if you keep a DEXRON®-III (H) fluid in modern transmissions for long enough, it could destroy it. Reliability issues in modern transmissions might be casually dismissed as vehicle age-related, missing the point that such problems might well have been avoided with an ATF designed for their specific needs.

A modern ATF portfolio

Being certain that a particular fluid was designed for modern transmissions requires a licensing program. Rigorously testing and licensing fluids that meet the DEXRON®-VI specification instills customer confidence. The OEM endorsement of quality and transmission reliability can open doors to new business and protect from poor-quality claims. DEXRON®-III (H) licenses expired when DEXRON®-VI specification was launched in 2005, GM being aware that its earlier specification could not support its latest hardware at that time. Licensed DEXRON®-VI fluid is today's guarantee of transmission reliability; a few formulations even hold dual licenses, adding Ford MERCON®-LV approval, having overcome the challenge of meeting two competing specifications to become a genuine multi-vehicle fluid.

Ultimately, the modern parc requires modern transmission fluids. Working closely with additive suppliers enables oil companies to offer a service fill fluid portfolio that meets the needs of today's step ATs, DCTs and CVTs, delivering reliability and confidence throughout the value chain.

DEXRON is a registered trademark of the GM Corporation.

MERCON is a registered trademark of Ford.



aftonchemical.com

INDUSTRIAL

GEAR

Future Ready, Present Perfect.



Unlock future opportunities with Afton's Industrial Gear Oil solutions.

In an era where the Industrial Gear market is evolving in complexity, Afton remains at the forefront with Industrial Gear solutions that are developed to enhance equipment productivity. Our next generation Industrial Gear additives have been developed to not only meet but exceed the ever-evolving demands of Industrial Gear specifications. Backed by extensive research, our Industrial Gear solutions offer the perfect balance for superior seal compatibility, unmatched wear protection and unrivalled thermal and oxidation stability.

When you choose Afton, you're not just selecting an unmatched solution for today, but also investing in the future of your operations. Stay ahead with Afton.

©2024 Afton Chemical Corporation is a wholly own subsidiary of NewMarket Corporation (NYSE: NEU). All rights are reserved and not to be copied, shared, or reproduced in any media without the express written permission of Afton Chemical Corporation.

 **Afton**
CHEMICAL
Passion for Solutions®