A BRIGHT FUTURE FOR TURBO REPAIR

As a leading provider of turbochargers and turbo parts, Melett has witnessed steady growth in demand for turbocharger maintenance and repair, stimulated by the relentless evolution in efficiency-led engine design. Celebrating its 30th anniversary in 2025, the company believes the future of the turbo repair industry will be further invigorated by the continued pursuit of fuel savings and lower emissions.

> *"90% of new car private buyers still favour internal combustion engine"*

Rise of the turbo

Despite record UK sales of battery electric vehicles in 2024, 90% of new car private buyers still favour internal combustion engined (ICE) alternatives including hybrids. Vehicle manufacturers (VMs) are responding to this demand with innovative developments to meet increasingly stringent emissions legislation, such as the Euro 7 standard due to be implemented from July 2025.

A popular strategy to reduce emissions by improving fuel efficiency is downsizing the engine capacity and restoring performance by turbocharging. This has become the norm for ICE vehicles during the past decade, and the practice is also becoming commonplace for hybrid vehicles.

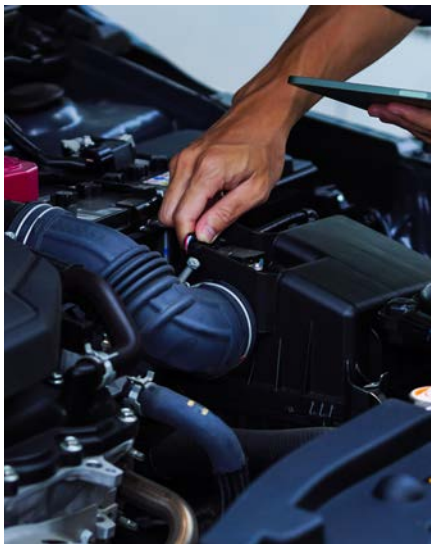
Designs for downsizing

Employing sub-one-litre engines for conventional vehicles and even smaller for hybrids reduces weight and emissions, but the depleted exhaust gas volume must still spin the turbo at sufficiently high speed to provide useful boost. Innovative turbocharger design can help: for example, a twin-scroll, dual-volute turbocharger takes advantage of exhaust gas pulses and dual gas pressure points acting on the turbine to provide smoother, more responsive operation. Alternatively, a variable geometry turbocharger has adjustable vanes within the turbine housing that direct gas flow to maximise torque across the engine operating range and minimise lag.

> ***Precision-engineered turbochargers should be repaired only by a skilled technician***

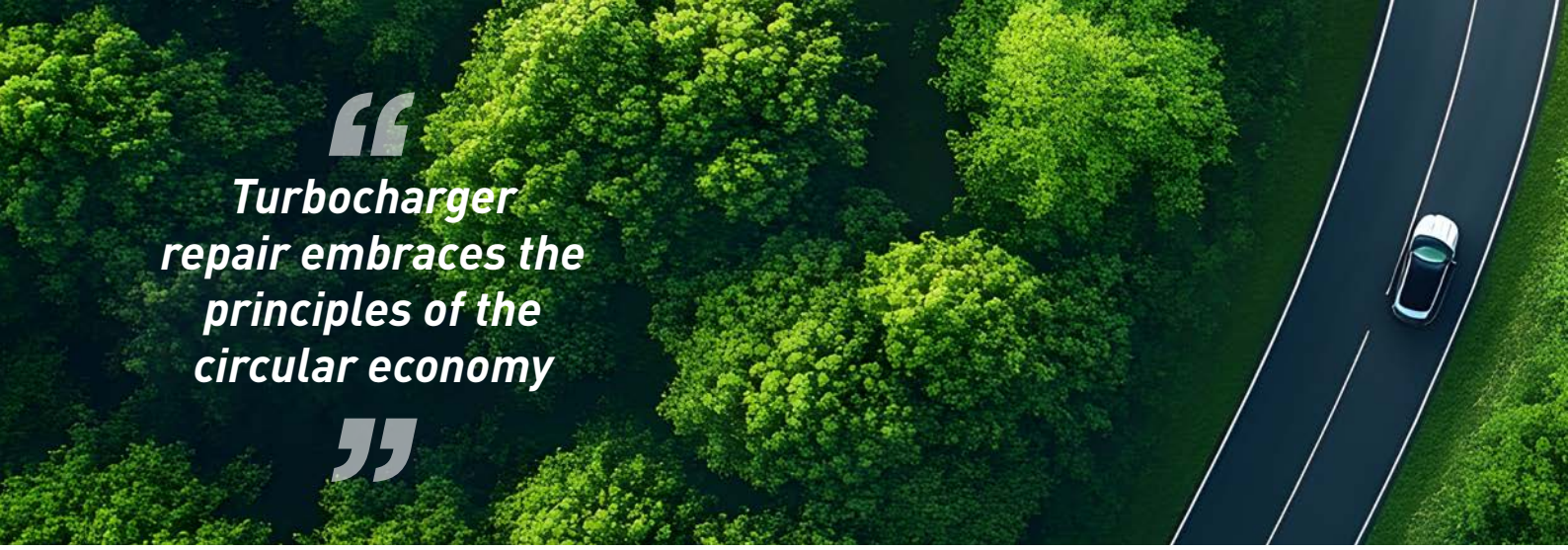
Fuelling the aftermarket

The prosperity of the original equipment (OE) turbocharger market directly influences the long-term success of the aftermarket for these critical components. VM investment in developing new turbocharger technologies for OE factory fit ensures a steady future supply of vehicles that require maintenance, repair and replacement of turbochargers.



Servicing this demand requires professional expertise. A precision-engineered turbocharger should be repaired only by a skilled technician with a full understanding of the complete turbo assembly and access to specialist equipment – for example, to rebalance the centre housing rotating assembly (CHRA) during rebuilding to prevent premature bearing failure.

In addition to technical proficiency, premium quality replacement components are a prerequisite. For example, Melett bearings and seals are typically manufactured to tolerances as low as two microns, an absolute necessity considering rotational speeds in excess of 200,000 rpm. In this operating environment, lower quality parts will not provide the required reliability, leading to premature turbo failure and possibly consequential engine damage.



> *Turbocharger repair embraces the principles of the circular economy*

Green credentials

Turbocharger repair embraces the principles of the circular economy and its central concept of dematerialisation – doing more with less. Repairing a turbocharger preserves as much of the original product as possible, using significantly less raw material than the manufacture of new products. Repair typically saves millions of tons of CO2 equivalent emissions, 85% of raw materials and 55% of energy compared with new production.

Historically, the reputation of repaired turbochargers was tainted by low-quality components from untrustworthy suppliers, but confidence in the quality of repaired products has improved with the adoption of components, tools and processes that meet or exceed OE standards. A professionally repaired turbocharger provides a dependable, environmentally sound and cost-effective alternative to a new OE replacement.

> ***Annual growth of more than 7% is forecast for the global turbocharger market from 2024 to 2033***

The future is turbocharged

Heavy investment in the development of carbon-neutral synthetic e-fuels as a drop-in replacement for petrol, diesel and LPG is intended to offer an extended tenure for ICEs and consequently also for turbochargers. However, continued innovation in turbocharger design is essential to meet new technical challenges. An example is the electric turbocharger (e-turbo), driven fully or in part by an electric motor. Spooling faster than a conventional mechanically-driven unit to deliver instantaneous air compression, it reduces turbo lag and enhances engine responsiveness. This technology is already proving advantageous for hybrid vehicles, but will also suit the rapid combustion characteristics of hydrogen-fuelled engines.

Compound annual growth of more than 7% is forecast for the global turbocharger market from 2024 to 2033, with the aftermarket currently achieving around 31% of the total revenue share. The emissions-driven trend toward turbocharging – whether for internal combustion, hybrid, or alternative fuel engines – is clearly laying the foundation for a steady increase in aftermarket demand for replacement turbochargers and repair parts, potentially extending well into the latter half of this century.

Meanwhile, as a reliable and trusted partner to the turbocharger repair industry, Melett continues to adapt its products and services to meet customer needs in a constantly changing market landscape.

Visit www.melett.com to learn more.

i Society of Motor Manufacturers and Traders
ii Society of Motor Manufacturers and Traders
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