Practical Tip: Conduct a Professional DMF Stress Test before Time-Consuming Component Removal

- **Conduct thorough troubleshoot check before costly DMF component exchange**
- **Bespoke Sachs tool allows inspection of installed dual-mass flywheels**

In spite of ever greater horsepower and higher torques, today's vehicles actually run very smoothly. The dual-mass flywheel (DMF) plays a crucial role in this by absorbing and almost completely eliminating torsional vibrations with its integrated spring and damping system. If a mechanic does hear unusual noises, the DMF is usually the first port of call even though in many cases it isn't the source of the problem. Here, ZF Aftermarket experts explain how to identify the possible cause of an unusual noise; before leaping to the wrong conclusion and exchanging the component unnecessarily. .

The dual mass flywheel (DMF) consists of a primary and a secondary mass and is located between the transmission system and the engine. The two flywheel masses, are separate but connected via a spring and damping system, and mounted in a slide or groove bearing which allows rotation. The torsional vibrations generated by the engine are thus reduced and largely separated from the rest of the driveline; resulting in less noise and increased ride comfort. When unusual noises suddenly occur, the suspicion quickly falls on the DMF – and it is not uncommon for it to be replaced without further inspection. However, according to the experience of experts from ZF Aftermarket, replacing the DMF is not only costly and time-consuming but often completely unnecessary as the cause lies elsewhere. For this reason, the experts recommend thorough investigation before removing the DMF.

A test drive can provide important insights

Firstly, carry out a test drive. If you hear unusual noises when you start the engine, it may indicate a defective DMF, but it could also be due to the engine cranking speed being too low. Other causes could be: poor

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starter performance, low battery voltage due to oxidation or corrosion of the electrical contact surfaces. To rule this out, the experts recommend a professional clean; using a special cleaning system developed by ZF Aftermarket with which workshops can easily, quickly and professionally clean affected electrical contact surfaces.

Another possible cause of unusual noises could be defective bearings in the belt tensioner freewheel. It is reasonable to suspect a faulty DMF if the noises occur during normal acceleration and gear changes and to determine this accelerate the vehicle in a high gear above idle speed from approx. 1200 rpm, with constant full throttle. If there are no banging noises, unusual vibrations or vehicle bucking while doing this, the DMF can be largely ruled out as a source of error.

Using engine Diagnostics to identify the problem
Engine diagnostics can provide additional information for example the measurement of engine starting speed and the injection quantity regulation. Cylinder-specific values of the idle resting regulation can indicate incorrectly operating injectors. If they are vibrating, it can overload the DMF, especially operating in full-throttle. The same applies to imprecise engine control, which may be caused by incorrectly adjusted timing gears on the belt drive. The test devices can also identify faults directly in the engine control unit (ECU) as well as changes caused by chip tuning, both of which can damage the DMF.

After the test drive and engine diagnosis, perform a visual and mechanical inspection of the actual DMF. A discolored friction surface on the secondary flywheel indicates a heavily overheated or overloaded DMF. This occurs when the driver allows the clutch to slip for too long. Such overheating over an extended period of time can cause the special grease in the DMF to harden. If there are visible cracks in the friction surface, the DMF must be replaced as it may crack at certain speeds and in the worst case scenario, total failure can occur. Yellowish discolorations under the friction surface – between rivets, for example – are also a reason for component replacement, since the DMF axial bearing is prematurely worn in this case – and this can cause a noise

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that you'd hear when driving. Other visible signs of a faulty DMF include both lubricant and fragments escaping from inside the component. Note however that slight traces of grease do not pose any problems, as they can, in some cases, be due to the design or approved depending on the vehicle manufacturer and have no influence on the function of the DMF.

Sachs tool enables inspection in installed and disassembled condition

ZF Aftermarket offers its workshop partners a high-quality bespoke tool for quick and professional inspection of Sachs dual-mass flywheels in passenger cars (PC) and light commercial vehicles (LCV) installed or not therefore preventing damage to a new clutch. The tool allows you to check: the free travel of the torsional damper, the regularity of the torsional damper's spring force, the axial bearing condition and the displacement travel of the radial bearing position. In a fully functioning and properly performing part, all angles and the perceived applied force in both directions should be identical. There should be no unusual movement and it should never stick or rub. Any of the above can indicate defective components inside the DMF, such as broken springs or slide shoes. These may wear through the inside of the DMF housing, allowing lubricant to leak. In these situations the DMF must be replaced.

An additional tip from ZF experts: A 'smacking' sound during the mobility test is a positive sign - indicating the right consistency of the special DMF grease.

ZF Aftermarket is a firm advocate of training; to ensure that today's technicians can cater for the vehicles of tomorrow. In line with this, the business provides in-depth, expert training courses across its chosen sectors under the ZF [pro]Tech concept. Experienced technical trainers provide theoretical and practical guidance on how to handle ZF genuine spare parts during diagnosis, servicing and repair.

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The DMF test tool is available from the ZF Online Shop under item number **4200 080 563** and the cleaning case under **4200 080 590**.

Captions:
The SACHS special tool enables ZF experts to check DMFs whilst they are installed.

Photo: ZF

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ZF is a global leader in driveline and chassis technology as well as active and passive safety technology. The company has a global workforce of 146,000 with approximately 230 locations in some 40 countries. In 2017, ZF achieved sales of €36.4 billion. ZF is one of the largest automotive suppliers worldwide.

ZF allows vehicles to see, think and act. The company invests more than six percent of its sales in research and development annually – in particular for the development of efficient and electric drivelines and also in striving for a world without accidents. With its broad portfolio, ZF is advancing mobility and services in the automobile, truck and industrial technology sectors.

With integrated solutions and the entire ZF product portfolio, the ZF Aftermarket Division of ZF Friedrichshafen AG guarantees the performance and efficiency of vehicles throughout their life cycle. Its combination of established product brands, digital innovations, customized products and services, and a worldwide service network has made ZF a sought-after partner and number two in the global automotive aftermarket.

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