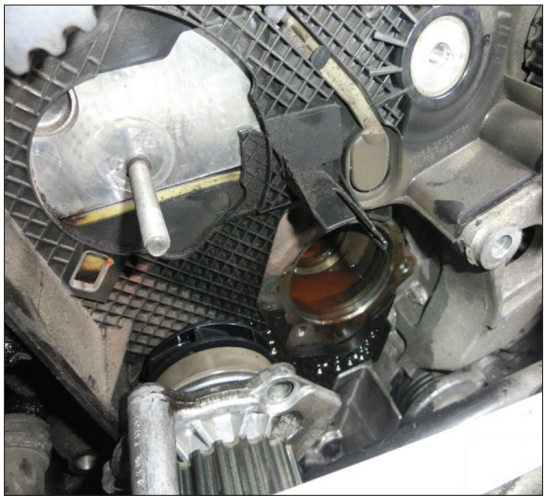
Best Practice **Belt driven water pumps**

As most workshops will be aware, timing belt replacement is a far more complicated job than it used to be, with specific processes to be undertaken and vehicle manufacturer (VM) stipulated torque figures particularly important to follow, to be able to complete the task correctly. On top of these requirements however, as the timing control system is increasingly used to drive the water pump, technicians are now also faced with the challenge of dealing with the cooling system as well.



Before installation of the new pump, clean and degrease all sealing surfaces, as well as the cavity where the pump fits

When tackling a timing belt replacement in a system that includes a water pump, technicians need to first ascertain if the vehicle's cooling system is working correctly or not. Then, even if it's okay, they need to ask themselves whether, if they don't replace the water pump, will it last until the next scheduled replacement of the timing belt? If they are in any doubt, they should certainly fit a new one.

If the decision is to replace the water pump along with the rest of the components in the drive system, on removal of the existing pump, all the old coolant should be drained and the system flushed to remove any debris before being replaced with new VM part number coolant, mixed with deionised water (not ordinary tap water), in the correct ratio.

In common with timing belt replacement, installation of the new water pump must be done following the VM's stated process, with the pump's gasket fitted correctly, without using any sealant, unless it is stipulated and then only use the correct formulation and in the quantity the VM indicates. In addition, before installation, the mating surface of the engine must be clean and free from debris.

Failed WP caused by no coolant, just tap water

Before the pump is installed, it must be primed with coolant. The pulley should not be rotated beforehand and then once primed, only in the correct direction. Care must be taken when inserting it into the engine's orifice, ensuring there is no misalignment. When in place, but before being tightened, the free movement of the pulley should be checked.

Failed WP from ompromised O ring seal and misaligned Timing Belt

It is vital that the correct VM's tightening procedure is followed and the torque values are respected. Failure to follow the precise installation procedure can lead to the pump being misaligned, which can cause a number of issues, including to the timing belt system, risking damage to the engine. In addition, if the pump is not evenly fastened, its flange can become distorted or break, and the gasket can leak.

It is also important not to overlook the VM's coolant installation procedure, which may stipulate the use of specific tools, such as a vacuum bleeding tool, to make sure the correct amount of coolant is pushed into the system.

Once the system is full, it should be bled/purged to eliminate air bubbles or air pockets. Air pockets trapped behind the pump, or air bubbles trapped inside its impellor chamber, can affect the pumps dynamic seal, causing premature wear and leading to coolant leaks and ultimately, bearing failure.

For more modern vehicles, the cooling system could consist of multiple water pumps, both mechanical and electrical, with the further addition of electrical one way valves. In these applications, once the system has been sealed and the new coolant added, the vehicle should be connected to a suitable diagnostic tool and the system can then be purged electronically. This procedure will activate the electronic pumps and the valves will be opened allowing coolant to flow and the air to be eliminated from the system.

In some cases more modern water pump construction consists of coolant blocking shields designed to allow the engine to heat up quickly after start up. This type of pump will utilise internal moving components, cavities and solenoid valves that can become contaminated and blocked if unclean coolant is re-used or if the system is not purged correctly."

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