

WATER PUMP DAMAGE PATTERNS

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LEAKAGE (DRAINAGE)

It is normal for a small amount of coolant (up to 12g per 10,000km) to escape through a mechanical seal. This is a normal occurrence and should not be cause for return.

Leakage can also occur because of the reasons described to the right.

Excessive leakage can cause bearing damage. (see below)

IMPROPER USE OF SEALANT



CAUSE

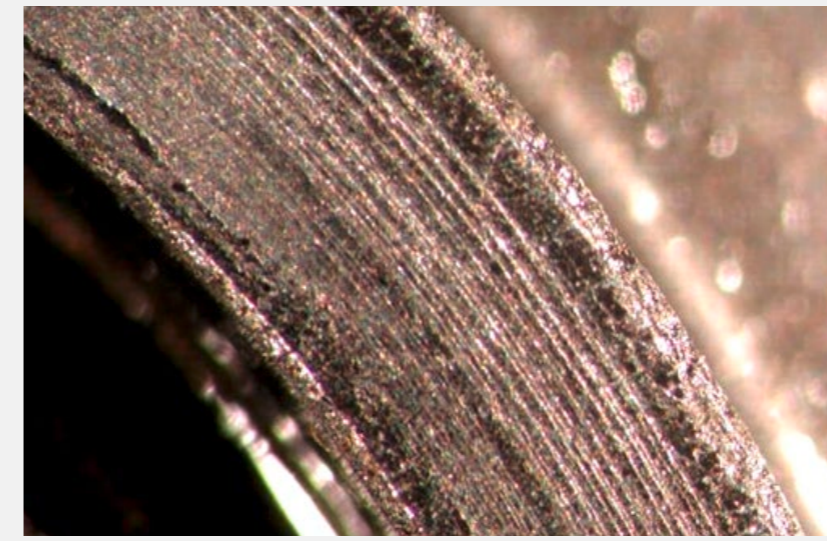
- Improper use of sealant is a frequent cause of water pump damage. If too much sealant is applied it may get into the cooling system and from here onto the area between the sliding ring and the stationary ring. This will then cause coolant to leak out of the water pump

SOLUTION

- After dismantling the water pump carefully remove any residual sealant from the sealing surface of the engine block
- Make sure the sealing surface is clean and that all grease particles have been removed. Evenly apply the sealant between the water pump and engine block as required to create a new seal

Note : Do not apply any sealant if the new water pump is already sealed

ABRASIVE MATERIAL



CAUSE

- Abrasive material such as rust, aluminum oxide and dirt gets between the sliding ring and the stationary ring. This then causes abrasive scratching of the material on both rings, which damages their surfaces and causes leakage
- A similar damage pattern appears, if the engine runs without coolant.

SOLUTION

- Thoroughly flush the cooling system
- Never reuse old or contaminated coolant
- Never start the engine without coolant

CRACKING DUE TO THERMAL SHOCK



CAUSE

- Cooling system not vented correctly or coolant level too low (which then comes in contact with gas cavities and coolant)
- Adding cold coolant into overheated engine

The damage appears as a crack across the diameter of either the seal face or the mating ring. This can also occur after a water pump replacement, if the engine is started without coolant

SOLUTION

- Vent the cooling system
- Ensure a correct coolant level
- Take proper precautions when filling radiator with coolant, especially when the engine is very hot. Allow hot engine to cool down before adding coolant. Never start the engine without coolant

BEARING DAMAGE

It is essential that the bearings in a replacement water pump are engineered to the exact vehicle manufacturer specifications.

Bearing module failure is most often caused by the premature failure of the water pump seal. A worn or failed seal cannot prevent fluids or contaminants from penetrating the bearing assembly.

BEARING DAMAGE



CAUSE

- Leakage due to damaged mechanical seal – see "Leakage (Drainage)". A damaged mechanical seal allows coolant to penetrate the bearing, washing out the grease

SOLUTION

- See "Leakage (Drainage)"

BEARING DAMAGE (EXCESSIVE LOAD)



CAUSE

- Excessive load due to incorrect belt tensioner
- Vibrations in the belt drive system
- Excessive bearing load when mounting the pump

SOLUTION

- Set the tension of the belt driving the water pump correctly; ensure that the belt, tensioner and pulleys are all aligned correctly

BROKEN SHAFT



CAUSE

- Excessive vibration & imbalance
- Bent, cracked, or broken fans
- Cracked or bent pulleys due to improper handling or installation
- Excessive torque on mounting bolts or improper torque sequence

SOLUTION

- Carefully check alignment of all pulleys. Also check the pulleys for straightness or fatigue. Carefully inspect fan/fan clutch assembly for a bent or damaged fan, or a worn/damaged fan clutch. Tighten the mounting bolts evenly according to the relevant vehicle manufacturer's specifications

COOLANT

Always choose a coolant that exactly meets vehicle manufacturer specifications.

Regularly changing the coolant and flushing the system prevents 'sludging'. Always observe the specifications and change intervals indicated by the vehicle manufacturer.

Normally, it is recommended that the coolant is changed every 2 years.

It is important to bleed the cooling system following any work on it. Some applications may require specific bleeding procedures – always follow the relevant vehicle manufacturer's instructions and recommendations.

RUST AND CORROSION



CAUSE

- Wrong concentration of coolant mixture
- Inadequate coolant level

SOLUTION

- Fully flush the cooling system
- Replace with new coolant when changing the water pump
- Use correct coolant mixture
- Fill system to the correct fluid level
- Bleed cooling system

PITTING



CAUSE

- Wrong coolant
- Wrong antifreeze mixture
- Inadequate coolant level

SOLUTION

- Use manufacturer recommended antifreeze
- Repair all cooling system leaks
- Regularly test the pressure cap
- Replace faulty parts with quality products (i.e. water pump, thermostat, pressure cap)
- Avoid modifications

MIXED COOLANTS



CAUSE

- Using different (incompatible) coolants at the same time

SOLUTION

- Fully flush the cooling system
- Refer to the manufacturer specifications for the right coolant to use

CALCIFICATION



CAUSE

- High lime content in the coolant (hard water)

SOLUTION

- Recommend to use low lime water or blend it with demineralised water

OTHER CASES

LEAKAGE FROM THE MOUNTING SURFACE



CAUSE

- Sealant applied unevenly or excessively
- Incorrect torque
- Contamination
- Mounting surface uneven

SOLUTION

- After dismantling the water pump carefully remove any residual sealant from the sealing surface of the engine block
- Do not exceed the specified tightening torques during installation
- Always use a new seal when installing the water pump

BROKEN CASTING



CAUSE

- Casting failure is normally associated with heavy vibration or imbalance which can be caused by a badly worn fan clutch or bent fan
- Excessive load when mounting the pump

SOLUTION

- Carefully inspect pulley, belt alignment and fan/fan clutch assembly, replacing any bent or worn components
- Do not use a lever or excessive force when mounting the water pump

OVERHEATING



CAUSE

- Insufficient flushing of the radiator
- Damage to cylinder head/cylinder head gasket

SOLUTION

- Fully flush the radiator
- Replace coolant with manufacturer specified mixture and fluid level
- Check cylinder head/cylinder head gasket (pressure test)

TIPS: GENERAL INFORMATION

- Before fitting, check that the new water pump is a direct replacement for the one being removed (mounting holes and pulley heights are aligned etc.)
- Always use a new seal when installing the water pump
- Always follow vehicle manufacturer instructions and recommendations
- Always observe vehicle manufacturer coolant and sealant specifications
- Using filtered or deionised water is recommended to prevent limescale
- Always use the recommended water to coolant ratio (approx 1:1)
- Do not exceed the specified tightening torques during installation
- Correctly align and tension the water pump drive belt

ALWAYS follow the relevant vehicle manufacturer's instructions and specifications during assembly and installation!

