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Document Information

Location: Powertrain - Cooling Systems

Topic: Coolant leak from engine coolant pump

Condition: N/A

Diagnostic Trouble Codes: N/A

Measure

The engine coolant pump has two areas that may have coolant staining under normal operation. These are known as the front, and rear evaporation chamber. For the coolant pump to work effectively, the cartridge seals rely on coolant to weep beyond the seal running surface. Coolant is used to maintain the seal effectiveness by cooling and lubricating, which protects the hard surfaces of the seal under normal operation.

The reservoirs are not sealed, each has an exit point and a hole at the top of the casting to aid evaporation. Reservoirs are used to minimise visible coolant staining occurring from allowable weep holes. Typically, evaporation rate of weep (especially at the expected normal operating temperature which speeds up evaporation) is greater than the weep accumulation rate. Under initial start-up and cold running conditions, the seal can be less effective and evaporation can be slower leading to a greater build-up of liquid coolant in the chambers which can drip during dynamic driving.

The front evaporation chamber exit can be easily misdiagnosed as a coolant pump gasket leak.

The rear evaporation chamber is below the output drive for the Air Conditioning Compressor and will show signs of staining on the underside.

Vehicles may exhibit coolant staining in these two areas from normal operation. Further detail below on the locations of the two-evaporation chamber exit points is detailed within this knowledge article.

Completing this knowledge article is essential to confirm if the pump is leaking coolant more than is expected.

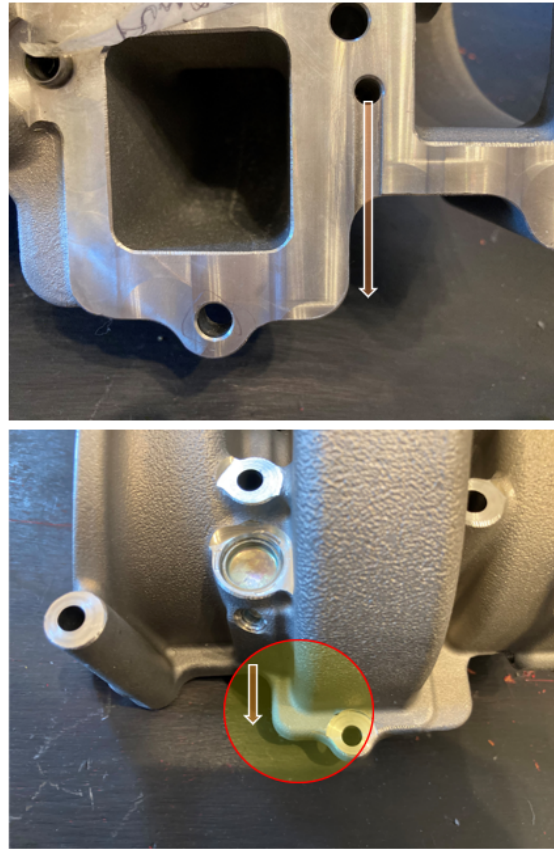
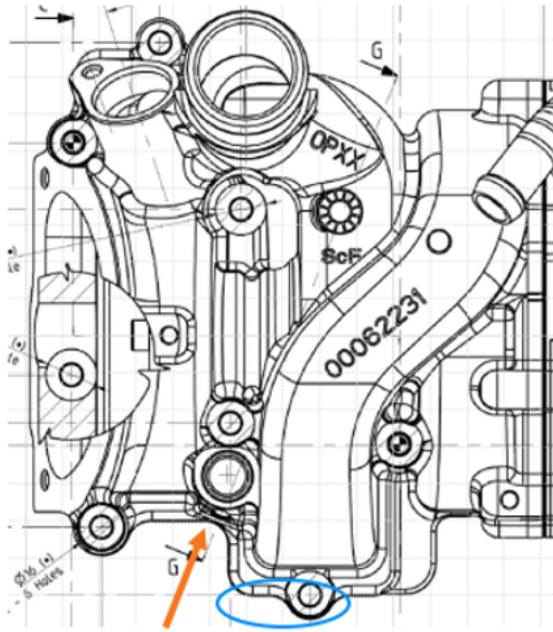
If a vehicle has evidence of coolant around the water pump, do not replace the engine coolant pump before the outlined diagnostic procedure has been followed. There are 3 potential areas of coolant loss that need to be investigated, this is due to a slight change in the location of the evaporation chambers.

1. On earlier models only, the coolant pump evaporation chamber was situated above the core plug. (See highlighted image below)



2. The images below show the front evaporation chamber exit where the coolant pump casing seals to the engine. Staining can collect near the highlighted bolt as a result of normal operation.

Front Evaporation Chamber Exit Information



3. At the rear of the coolant pump (Air Conditioning drive side) there is a core plug which covers the rear evaporation chamber. There is a small gap in the top of the casting to allow evaporation to occur, ref orange arrow. (On older parts beginning with "11", the evaporation chamber exit will be at the side of the core plug, ref blue arrow.



If coolant staining or an active leak is highlighted in these areas, follow the instructions detailed in this Knowledge Article.

Instructions for the remedial work to be carried out are divided into two sections.

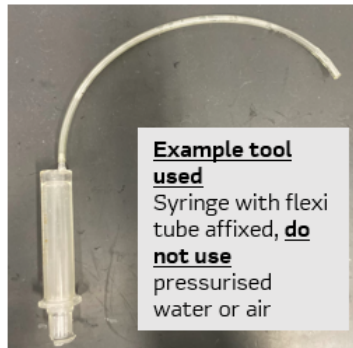
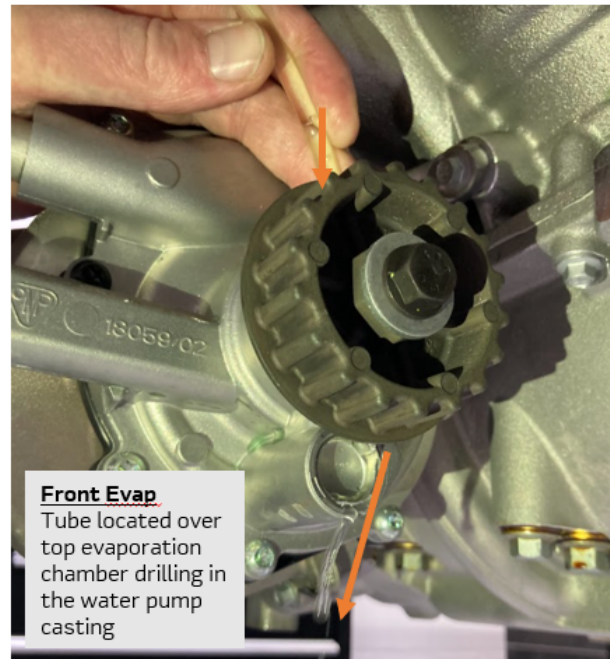
Instruction 1 - If there is staining noticed during a service, or during any other on- ramp work conducted at a McLaren Retailer.

Instruction 2 - If the vehicle has arrived at the Retailer specifically for a coolant leak.

Instruction 1 – Coolant staining found during service or other “on – ramp” activities in the Retailer

1. Lift vehicle on lifting platform
2. Remove/install floor panel - Engine/fuel tank
3. Capture photos of the coolant leak area, and the underfloor.
4. Clean off any coolant stains from the coolant pump using only water. Do not use any other cleaning liquids.
5. Clean any coolant from weep chambers. This is to be done by passing clean fresh water (unpressurised) through the weep chamber with a syringe (syringe to be sourced locally).

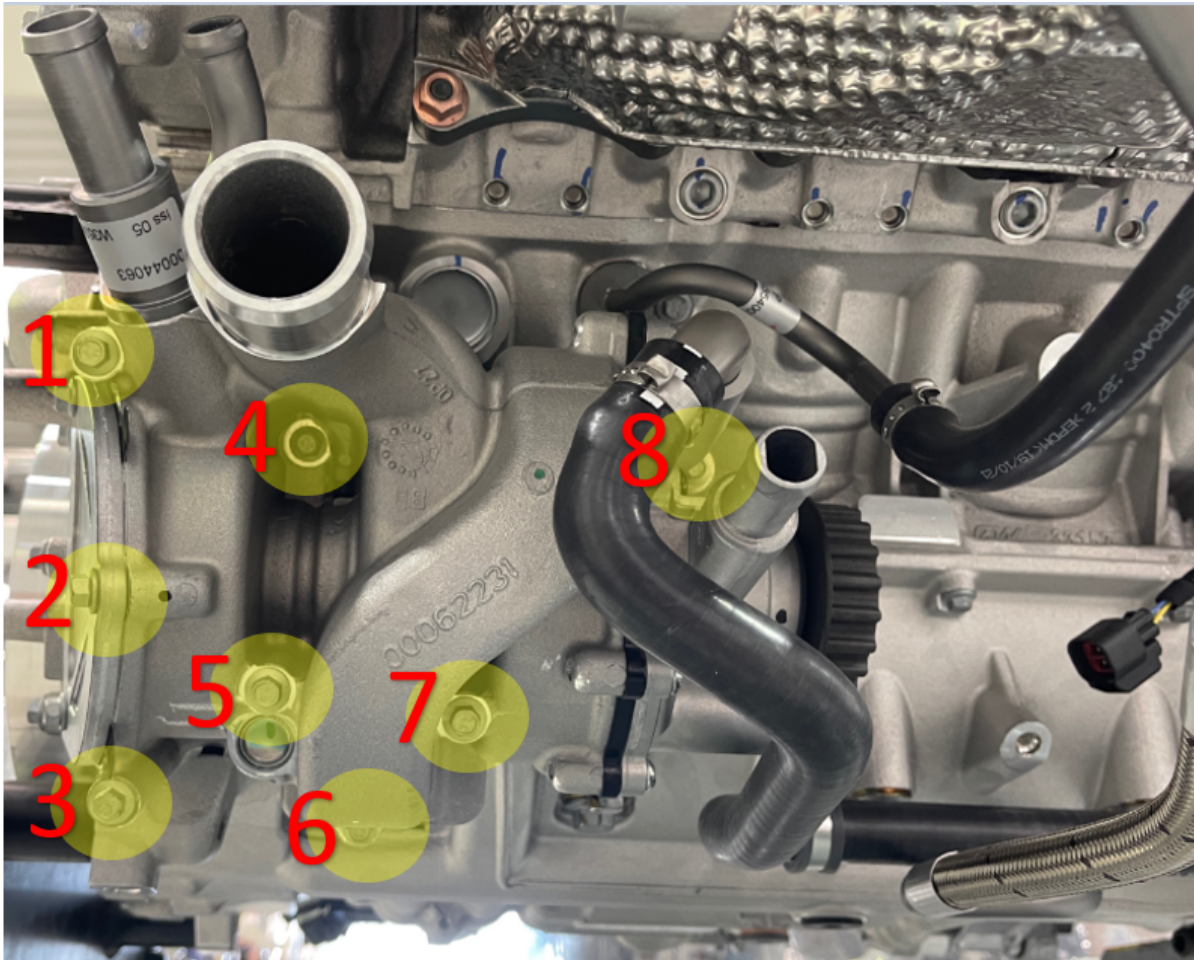
Ensure that fresh water is dripping from the weep chambers with no further evidence of coolant. Wait for this dripping to stop before moving to the next step, continuing to wipe away excess water.





6. Using the now empty syringe tool used for the previous step, blow air through the front and rear evaporation chambers, this will clear the remaining fresh water added that is below the leak level of the drain. Do not use shop air feed to complete this step.
7. Diagnostic Drive Cycle - Start the car, allowing the car to warm up to normal operating condition. This drive cycle requires 'open road' driving conditions. Drive the car, remaining in lower gears where possible and proceed to accelerate to the current and safe speed limit of the road. Once the speed limit has been reached. Repeat this procedure as many times as possible ensuring engine operating temperature is reached. This is an extended road test that should create warmer surface temperatures of the engine components, namely the water pump.
8. Idle for 10 mins and monitor if blue coolant can be seen leaking from the front, or rear evaporation chambers. Capture a video, minimum 2 minutes in length clearly showing the repeated leak following the completion of the above steps. This video will be required to complete a successful warranty claim.
9. Shutdown the engine and allow the engine to cool for 30 minutes
10. Check again if blue coolant is leaking from the initial concern area
11. If there is no further leak, then no further action is required. Re-assemble the vehicle and return to the customer. This is considered normal operation of the pump, and the driving profile may have had an input into the slightly increased coolant weep.

12. If a leak is present and the water pump is to be replaced following the above steps, during the removal process, record the break off torques of the below fixings. These fixings are specified as the coolant pump to block mounting bolts. These values will be requested as part of the warranty claim.



NOTE: Fixing number 2 is behind the service cover

Instruction 2 – Customer states coolant leak visible / coolant level is low

1. Lift vehicle on lifting platform
2. Remove/install floor panel - Engine/fuel tank
3. Confirm coolant is leaking from the coolant pump and capture initial images of the water pump leak area, underfloor panels and any other supporting evidence.
4. Clean off any coolant stains from the coolant pump using only water. Do not use any other cleaning liquids.

5. Diagnostic Drive Cycle - Start the car, allowing the car to warm up to normal operating condition. This drive cycle requires 'open road' driving conditions. Drive the car, remaining in lower gears where possible and proceed to accelerate to the current and safe speed limit of the road. Once the speed limit has been reached. Repeat this procedure as many times as possible ensuring engine operating temperature is reached. This is an extended road test that should create warmer surface temperatures of the engine components, namely the water pump.
6. Idle for 20 mins and monitor if blue coolant is leaking from the same area. Capture a video of the leak from the water pump. The video must be two minutes long.
7. Shutdown the engine and allow the engine to cool for 15 minutes
8. Check again if coolant is leaking
9. If there is no further leak, no further action is required. Re-assemble the vehicle and return to the customer. This is considered normal operation of the pump, and the driving profile may have had an input into the slightly increased coolant weep.
10. If a leak is present and the water pump is to be replaced following the above steps, during the removal process, record the break off torques of the below fixings. These fixings are specified as the coolant pump to block mounting bolts. These values will be requested as part of the warranty claim. NOTE: Picture located in previous steps

Warranty Information

If a warranty claim is to be made for the replacement of the pump, please provide the following information within the claim:

Mandatory:

- Was the engine coolant leak the primary customer concern?
- What is the customer's driving profile?
- Copy of the DTCs
- Copy of the video captured at Step 11

If Available:

- What is the customer's driving profile?
- Record break off torque of the fixings quoting the bolt position number as per image in *Instruction 1 - Point 11*

Attachments

N/A