USMW PROFESSIONAL SERIES
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SUCCESS IN COOLING

ENGINE WATER PUMPS

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WATER PUMP

The water pump is responsible for pressuring and propelling anti-freeze mixture (coolant) through the cooling system. Five main components make up an engine water pump: the hub, bearing, housing with a weep-hole or chamber, seal, and impeller. Of these five, the water pump seal and the bearing are found to have the highest instances of failure.

THE COMPONENTS OF A WATER PUMP:

WATER PUMP BEARING

The water pump bearing allows for the water pump to rotate. The ball bearings and/or roller bearings (also known as an integral shaft bearing), are contained in a case packed with bearing grease. The two ends of the case are sealed, securing the bearing case. On one end is the press-fit water pump hub or pulley, and on the other end is the press-fit water pump impeller. A shaft rotates in the center of the bearing case. The bearing case is press-fit into the water pump housing along with the seal.

The seals on the water pump bearing case are not only designed to keep the bearing grease in, but to keep harmful engine residue and particulates out. It is important to note that the bearing seals will not withstand coolant. If coolant passes the water pump seal, it will enter the bearing case and washout the grease. If this occurs, the water pump has completely failed. It will begin to make loud noises, causing the water pump to consequently seize and break apart.

BENEFITS OF CASE HARDENED BEARINGS

- ***Long life***
- ***High load capacity***
- ***Tough on the outside, flexible on the inside***
- ***Can better withstand an imbalance or vibration in the cooling system***

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THE COMPONENTS OF A WATER PUMP:

WATER PUMP SEAL

The water pump seal is critical for water pump operation. The bearing rotates within the center of the seal, which turns the impeller, moving the coolant through the cooling system. The seal contains coolant within the housing or designed block cavity, and its critical function is to keep the coolant from contacting the water pump bearing.

A water pump leak will indicate an initial seal failure. A small amount of coolant will escape the water pump through the weep-hole or chamber. This is yet another design feature to keep coolant away from the water pump bearing. The water pump should be replaced if a leak is found from the weep-chamber after operation of the vehicle.

DID YOU KNOW?

The seal on the water pump has a break in period of about ten minutes of operation. Small seepage is completely normal and very common in a water pump replacement.

THE COMPONENTS OF A WATER PUMP:

WEEP-HOLE / CHAMBER

Mechanical water pumps are purposefully designed with a weep-hole. The purpose of the weep-hole is to keep coolant away from the water pump bearing during seal failure and allows for coolant to escape during initial water pump break in. Many new OEM water pump designs now include a chamber surrounding the weep-hole. This weep-chamber allows the normal break in seepage to be collected and evaporate rather than a drip or two falling into the engine compartment or to the ground, alarming the customer and polluting the environment.

THE COMPONENTS OF A WATER PUMP:

METAL IMPELLERS

BENEFITS OF METAL IMPELLERS

- *Highly durable*
- *Will not crack during press fit*
- *Will not shatter or deform*
- *Performs at high RPMs*
- *Withstands high torque forces*
- *Withstands high temperatures*
- *Withstands chemicals*