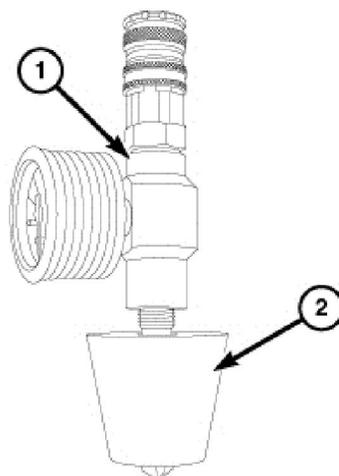


## Water Pump: Procedures

### Water Pump - Coolant Air Evacuation

#### COOLANT AIR EVACUATION



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Evacuating or purging air from the cooling system involves the use of a pressurized air operated vacuum generator. The vacuum created allows for a quick and complete coolant refilling while removing any airlocks present in the system components.

**NOTE:** To avoid damage to the cooling system, ensure that no component would be susceptible to damage when a vacuum is drawn on the system.

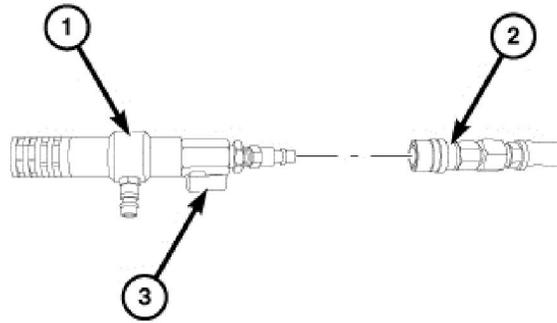
**WARNING:** ANTIFREEZE IS AN ETHYLENE GLYCOL BASE COOLANT AND IS HARMFUL IF SWALLOWED OR INHALED. IF SWALLOWED, DRINK TWO GLASSES OF WATER AND INDUCE VOMITING. IF INHALED, MOVE TO FRESH AIR AREA. SEEK MEDICAL ATTENTION IMMEDIATELY. DO NOT STORE IN OPEN OR UNMARKED CONTAINERS. WASH SKIN AND CLOTHING THOROUGHLY AFTER COMING IN CONTACT WITH ETHYLENE GLYCOL. KEEP OUT OF REACH OF CHILDREN. DISPOSE OF GLYCOL BASED COOLANT PROPERLY. CONTACT YOUR DEALER OR GOVERNMENT AGENCY FOR LOCATION OF COLLECTION CENTER IN YOUR AREA. DO NOT OPEN A COOLING SYSTEM WHEN THE ENGINE IS AT OPERATING TEMPERATURE OR HOT UNDER PRESSURE; PERSONAL INJURY CAN RESULT. AVOID RADIATOR COOLING FAN WHEN ENGINE COMPARTMENT RELATED SERVICE IS PERFORMED; PERSONAL INJURY CAN RESULT.

**WARNING:** WEAR APPROPRIATE EYE AND HAND PROTECTION WHEN PERFORMING THIS PROCEDURE.

**NOTE:** The service area where this procedure is performed should have a minimum shop air requirement of 80 PSI (5.5 bar) and should be equipped with an air dryer system.

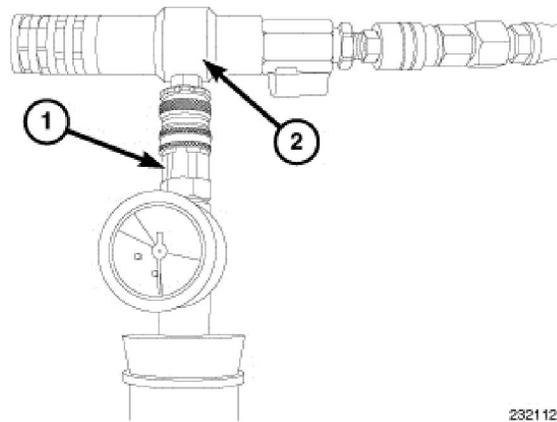
**NOTE:** For best results, the radiator should be empty. The vehicle's heater control should be set to the heat position (ignition may need to be turned to the on position but do not start the motor).

1. Refer to the Chrysler Pentastar Service Equipment (Chrysler PSE) Coolant Refiller #85-15-0650 or equivalent tool's operating manual for specific assembly steps.
2. Choose an appropriate adapter cone that will fit the vehicle's radiator filler neck or reservoir tank.
3. Attach the adapter cone (2) to the vacuum gauge (1).



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4. Make sure the vacuum generator/venturi ball valve (3) is closed and attach an airline hose (2) (minimum shop air requirement of 80 PSI/5.5 bar) to the vacuum generator/venturi (1).
5. Position the adaptor cone/vacuum gauge assembly into the radiator filler neck or reservoir tank. Ensure that the adaptor cone is sealed properly.



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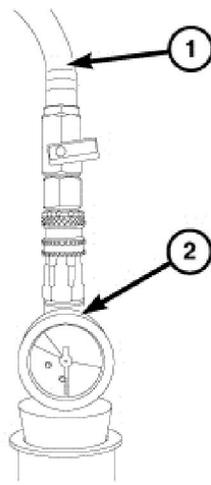
6. Connect the vacuum generator/venturi (2) to the positioned adaptor cone/vacuum gauge assembly (1).
7. Open the vacuum generator/venturi ball valve.

**NOTE: Do not bump or move the assembly as it may result in loss of vacuum. Some radiator overflow hoses may need to be clamped off to obtain vacuum.**

8. Let the system run until the vacuum gauge shows a good vacuum through the cooling system. Refer to the tool's operating manual for appropriate pressure readings.

**NOTE: If a strong vacuum is being created in the system, it is normal to see the radiator hoses to collapse.**

9. Close the vacuum generator/venturi ball valve.

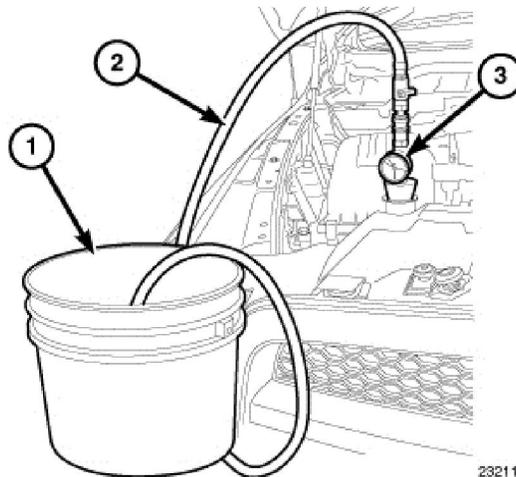


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10. Disconnect the vacuum generator/venturi and airline from the adaptor cone/vacuum gauge assembly.
11. Wait approximately 20 seconds, if the pressure readings do not move, the system has no leaks. If the pressure readings move, a leak could be present in the system and the cooling system should be checked for leaks and the procedure should be repeated.
12. Place the tool's suction hose into the coolant's container.

**NOTE: Ensure there is a sufficient amount of coolant, mixed to the required strength/protection level available for use. For best results and to assist the refilling procedure, place the coolant container at the same height as the radiator filler neck. Always draw more coolant than required. If the coolant level is too low, it will pull air into the cooling system which could result in airlocks in the system.**

13. Connect the tool's suction hose (1) to the adaptor cone/vacuum gauge assembly (2).



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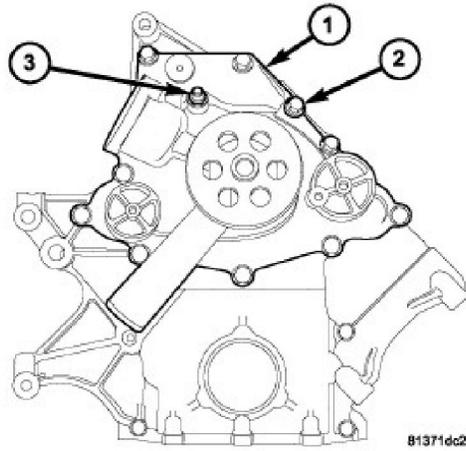
14. Open the suction hose's ball valve to begin refilling the cooling system.
15. When the vacuum gauge reads zero, the system is filled.

**NOTE: On some remote pressurized tanks, it is recommended to stop filling when the proper level is reached.**

16. Close the suction hose's ball valve and remove the suction hose from the adaptor cone/vacuum gauge assembly.
17. Remove the adaptor cone/vacuum gauge assembly from the radiator filler neck or reservoir tank.
18. With heater control unit in the HEAT position, operate engine with container cap in place.
19. After engine has reached normal operating temperature, shut engine off and allow it to cool. When engine is cooling down, coolant will be drawn into the radiator from the pressure container.
20. Add coolant to the recovery bottle/container as necessary. **Only add coolant to the container when the engine is cold. Coolant level in a warm engine will be higher due to thermal expansion.** Add necessary coolant to raise container level to the COLD MINIMUM mark after each cool down period.
21. Once the appropriate coolant level is achieved, attach the radiator cap or reservoir tank cap.

## Water Pump - Inspection

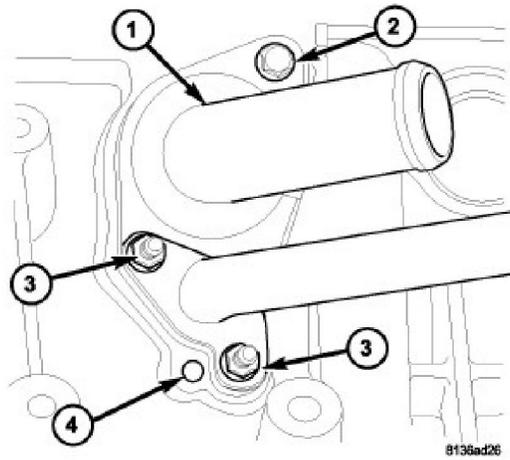
### WATER PUMP



1 - WATER PUMP ASSEMBLY
2 - BOLT
3 - DOUBLE ENDED BOLT

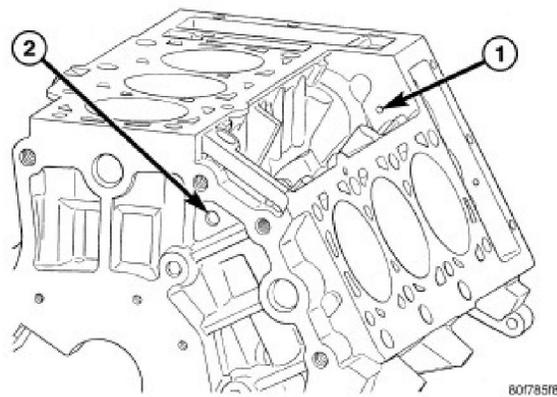
Inspect and replace the water pump if it has any of the following defects:

1. Damage or cracks on the pump body.



1 - THERMOSTAT HOUSING/COOLANT INLET
2 - BOLT
3 - NUT
4 - WEEP HOLE

2. Coolant leaks: If the shaft seal is leaking, this will be evident by traces of thick deposits of dried glycol running down from the pump primary weep passage. A thin black stain below the pump primary weep hole/passage is considered normal operation.



1 - WEEP PASSAGE TO VALLEY OF BLOCK
2 - HOLE IN REAR OF BLOCK

3. Coolant leaks: If the pump primary weep passage is plugged, coolant may come from the secondary weep passage and collect in the valley of the engine. The coolant will eventually run out the back side of the engine. Leakage from the secondary weep passage may give false indications that core plug(s) may be leaking on the back side of the engine block. If this condition is found, clean the primary weep passage of debris.

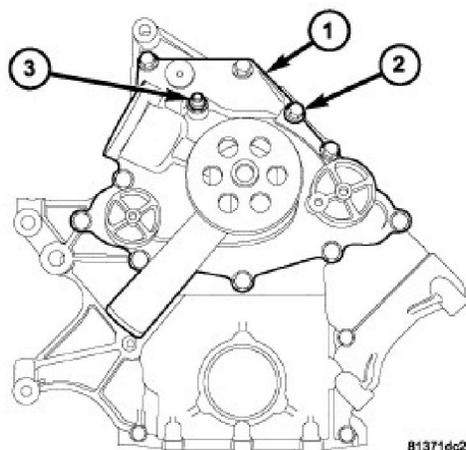
**NOTE:** It is normal for the water pump to weep a small amount of coolant from the primary weep hole (black stain at weep passage). Do not replace the water pump if this condition exists. Replace the water pump if a heavy deposit or a steady flow of engine coolant is evident from the primary weep passage. This indicates a shaft seal failure and pump must be replaced. Coolant may leak from the secondary weep passage and fill the valley of the engine. If this condition is found, clean the primary weep passage of debris. Be sure to perform a thorough analysis before replacing water pump.

4. Impeller rubs inside of cylinder block.
5. Excessively loose or rough turning bearing.

## Water Pump: Removal and Replacement

### Water Pump - Removal

6.1L ENGINE



1 - WATER PUMP ASSEMBLY
2 - BOLT
3 - DOUBLE ENDED BOLT

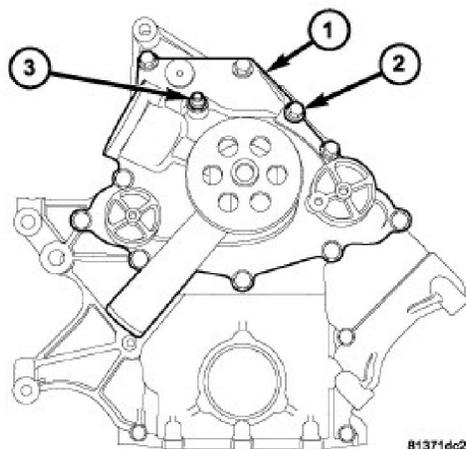
1. Disconnect negative battery cable.
2. Drain cooling system See: Service and Repair.
3. Remove radiator fan assembly See: Radiator Cooling Fan/Service and Repair/Cooling Fan - Removal.
4. Remove accessory drive belt See: Engine/Drive Belts, Mounts, Brackets and Accessories/Drive Belt/Service and Repair/Removal and Replacement/Serpentine Accessory Drive Belt - Removal
5. Remove thermostat See: Thermostat/Service and Repair/Engine Coolant Thermostat - Removal

**NOTE:** The water pump mounting bolts (2) are different lengths. Note the location of the water pump mounting bolts (2).

6. Remove water pump mounting bolts (2) and remove water pump (1).

### Water Pump - Installation

6.1L



1 - WATER PUMP ASSEMBLY
2 - BOLT
3 - DOUBLE ENDED BOLT

1. Install water pump and mounting bolts (2). Tighten mounting bolts to 28 Nm (20 ft. lbs.).
2. Make sure double ended bolt (3) is in the proper location. Tighten double ended bolt to 28 Nm (20 ft. lbs.).
3. Install thermostat See: Thermostat/Service and Repair/Engine Coolant Thermostat - Installation.
4. Install accessory drive belt See: Engine/Drive Belts, Mounts, Brackets and Accessories/Drive Belt/Service and Repair/Removal and Replacement/Serpentine Accessory Drive Belt - Installation.
5. Install the radiator fan assembly See: Radiator Cooling Fan/Service and Repair/Cooling Fan - Installation.
6. Connect negative battery cable.
7. Evacuate air and refill cooling system. See: Procedures/Water Pump - Coolant Air Evacuation
8. Check cooling system for leaks. See: Testing and Inspection/Component Tests and General Diagnostics