SAE International™

SURFACE VEHICLE RECOMMENDED PRACTICE

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Engine Water Pump Remanufacture Procedures and Acceptance Criteria

RATIONALE

The Service Development Technical Committee requests that this document be re-classified as “Noncurrent”. The reason for the change of designation is that we no longer have any members with expertise to maintain the document.

1. SCOPE

This SAE Recommended Practice establishes remanufacturing procedures and acceptance criteria for engine water pumps.

2. REFERENCES

This document is based on “Acceptance Criteria for Rebuilt Vehicular Water Pump,” NSN as published by the Defense Construction Supply Center, Columbus, OH, GS-2930-006-1977.

3. DEFINITIONS

3.1 OEM

This term means the original equipment manufacturer, which is the firm that originally manufactured, fabricated, or supplied a vehicle, vehicle component, or a vehicle part. OEM may include items manufactured by a subcontractor for an OEM.

3.2 Remanufactured Water Pump

This water pump has been disassembled, cleaned, processed, with worn parts replaced, and tested to meet or exceed the requirements of this document and it will provide service and life expectancy equal to OEM specifications.

4. PREPARATION

4.1 The water pumps shall be completely disassembled, using proper tools and procedures to prevent damage to pump housing, hub and impeller, which can be reused. All other parts shall be discarded and replaced with new parts in all cases.

4.2 The pump housing, hub and impeller shall be cleaned to remove rust, paint, grease, and any other contaminants.

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4.3 The impeller shall be inspected and replaced with a new OEM or equivalent component if excessively pitted, broken, or worn as shown by reduced vane height. Refer to OEM specifications for height and tolerance. On water pump designs where the impeller faces against the seat, the face is to be machined to an appropriate finish for a leakproof water seal. Remachining of impeller hub shall be limited to a level that assures proper vane clearance to an adjoining surface, such as the pump housing or the engine. The sealing surface must be assuredly perpendicular to the bore in order to prevent runout of the seal.

4.4 In the hub, the bore shall be free of deep nicks and gougings (or raised metal on the face and bore area), which could prevent proper functioning or proper interference fit on the bore. All hub threads needing to be chased shall be chased. Mechanical devices for proper threads may be inserted. Hubs with threads, which are not repairable, shall be scrapped. On pumps with viscous fan drive applications, the runout of the fan hub face could be critical and it should be within OEM specifications so that the viscous fan operation is not affected.

4.5 The pump housing shall be visually inspected for cracks, excessive corrosion and pitting, and damaged or stripped threads. Cracked housings shall be discarded. Pitting may be corrected using a quality doping compound and minimal pitting is acceptable where such usage and condition would not affect or impair the proper functioning or operational life expectancy of the housing. Aluminum housings that show medium-light pitting shall be discarded.

4.6 If the pump housing design is the type where the seal seats are against the housing, remachine and polish the pump seal seat perpendicular to the bore to allow proper sealing. Treat all cast iron housings, hubs, and back plates with rust-inhibiting oil.

4.7 The reused back plates shall be flat and free of medium-light corrosion or pits that could impair functioning during the life of the pump.

5. REASSEMBLY

5.1 Reassemble the new pump shaft-bearing assembly, new seals and gaskets in the pump housing using OEM recommended press fit tolerances, tools, and procedures. Use OEM recommended procedures for sealing compounds, sealing surfaces, tolerances and final clearances between impeller vanes and pump housings. Hardening adhesives will not be used to establish the bearing interference fit; however, the use of a quaity hardening adhesive may augment the fit. The following press-fit tolerances are recommended in the bore diameter of the housings.

a. Cast iron Housing:
0.01524 mm/0.0006 in minimum interference
0.05334 mm/0.0021 in maximum interference

b. Aluminum Housing:
0.02794 mm/0.0011 in minimum interference
0.06604 mm/0.0026 in maximum interference

c. Hub and Impeller Fit
A minimum interference of 0.04318 mm/0.0017 in to a maximum interference of 0.08128 mm/0.0032 in is recommended.

5.2 The use of impellers with a different number of vanes, outside diameters or vane heights than originally used in the pump, is not allowed as this may cause different flow/delivery of the pump performance and may have detrimental effects or cause engine damage.

5.3 Painting is acceptable, but not required, providing the assembly is sufficiently cleaned and treated to inhibit rust and present an aesthetic appearance. No paint is permitted on hub fan or pump mounting surface.

5.4 Each remanufactured water pump shall be provided with appropriate mounting gaskets or OEM equivalent sealing devices.