

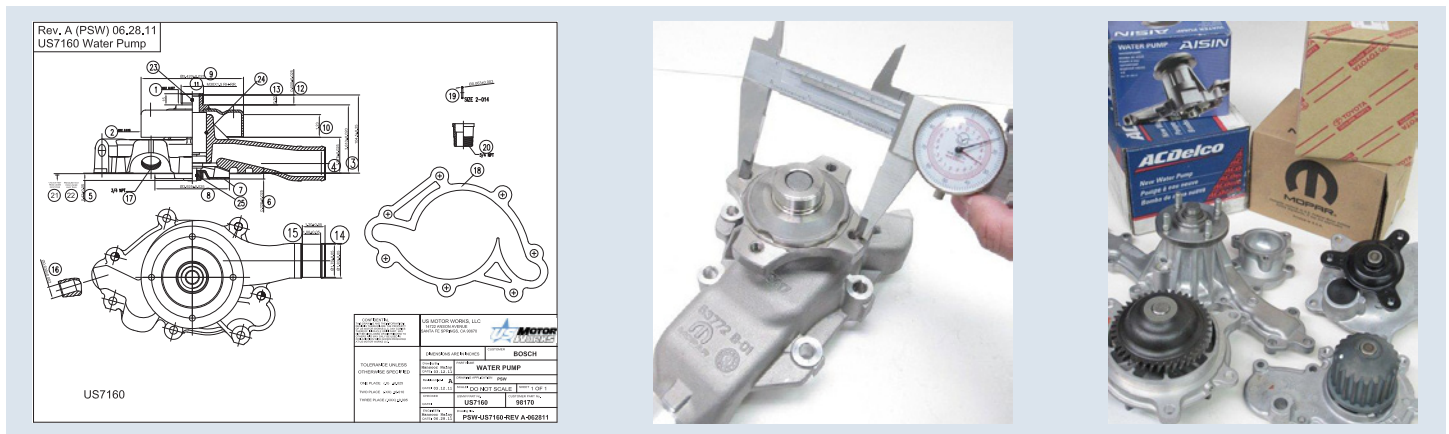
Bosch Water Pumps

Quality Inspection Procedures



Quality and Design

Every Bosch water pump is manufactured to meet OE applications. We apply OE dimension specifications to all our products for proper function and fit. Critical dimensions and tolerances, based on OE specifications, are followed to obtain consistent quality products. Our Engineering and Quality Assurance Departments follow sophisticated quality inspection approaches, methods, processes, and design improvement.



Sophisticated Quality Inspection Process

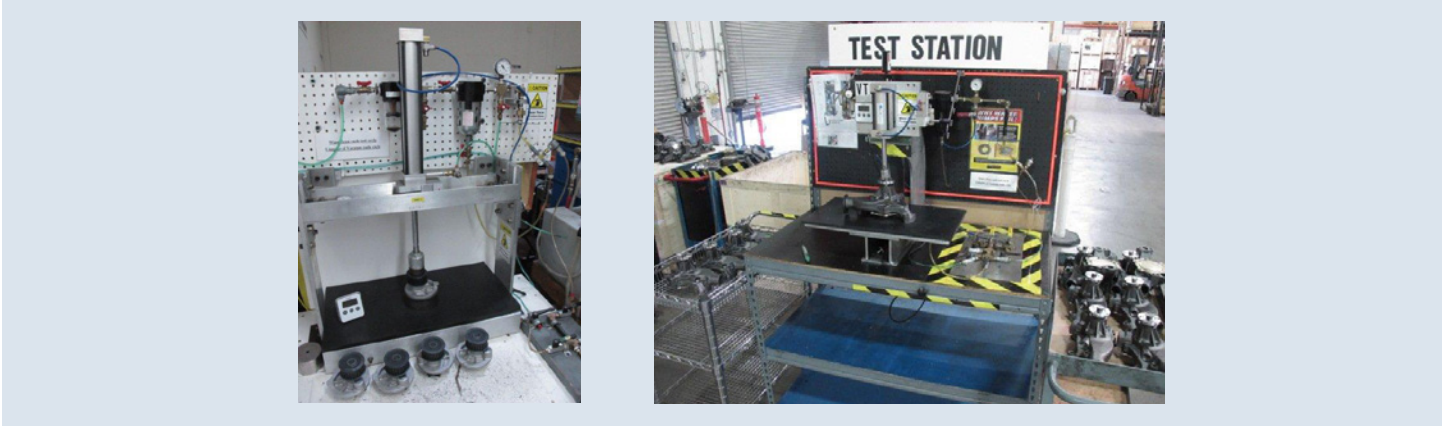
Our highly-trained inspectors apply stringent quality control methods and inspection processes based on ISO:9001 (the industry standard of quality) to ensure that all Bosch products meet correct specifications, consistent quality, and customer demands.

Critical Measurements



Precision measuring tools are employed to inspect critical features, verify correct measurements, and ensure tolerances are within specification. Major components, including bearings, housings, seal, pulleys, and hubs are inspected prior to assembly.

Vacuum Testing



Water pumps are vacuum-leak-tested to ensure proper sealing. This test can detect leaks throughout the housing, porosity, faulty water pump seals, tube binding, and plugs leakage. All Bosch water pumps are required to pass vacuum testing prior to final approval.

Impeller-Shaft Torque Test



Torque testing is performed to verify proper impeller-shaft mating. Torque testing can detect loose impeller-shaft press fits. Calibrated torque wrenches and bench-vice fixtures are used to turn impellers against the fixed shaft, following required specification limits, per each application.

Force Test-Press Fit Check

Bearing-housing and pulley/hub-shaft press fit tests are performed.



Water pumps are tested to guarantee a good press fit between mating components. Inspection includes hub or pulley-shaft and bearing-housing press fitting. A calibrated hydraulic piston with multiple force adjustment is used for inspection.

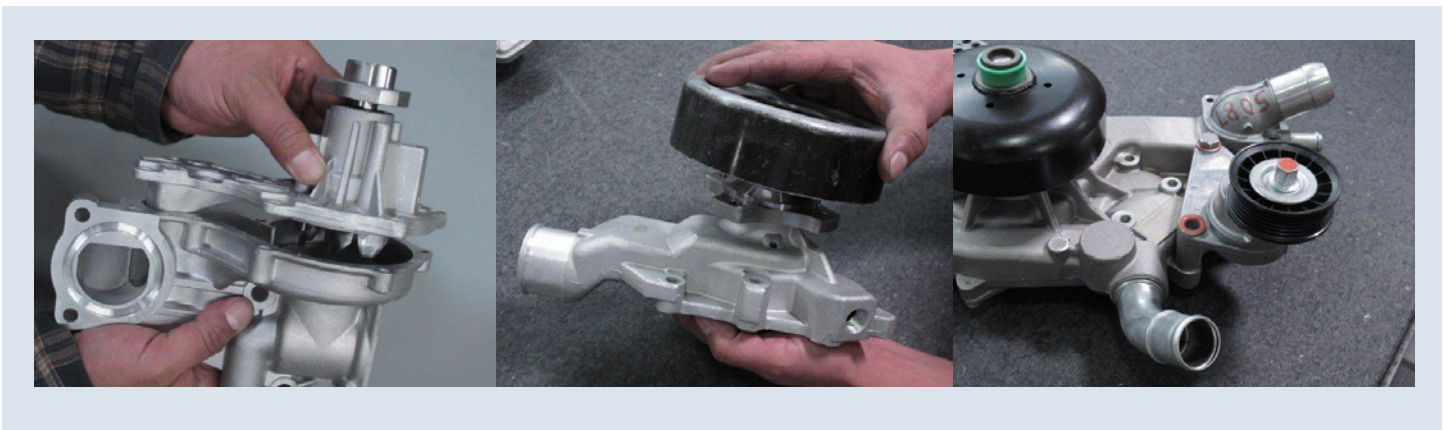
Detailed Visual Inspection



Microscopes and magnifying devices are utilized extensively to identify micro-cracks and observable surface variations that may appear on component surfaces.

Fit Check

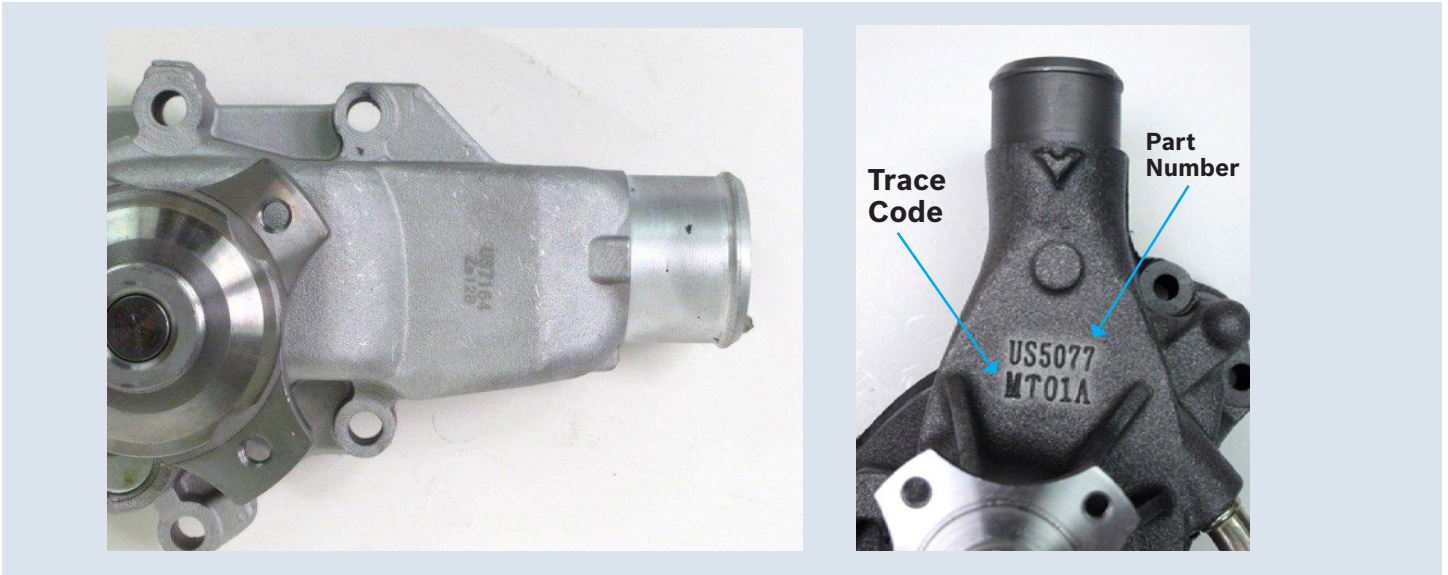
Bosch utilizes OE mating parts and accessories on water pumps to verify proper fitment. Component mating, such as pulley, back plate, housing, tensioners, and belts are included in our inspections.



Technical Improvements

Trace Codes

All Bosch water pumps have trace codes which identify both production and shipment dates.



Case-Hardened Bearings

Bosch uses case-hardened type bearings for improved longevity of water pumps. Case-hardened bearings handle higher workloads with greater longevity than regular, non-hardened and through-hardened bearings.

Our bearings are designed as specified by the OE to meet the specific radial and axial load requirements of each application.



Competitors' use of a through-hardened bearing



Bosch water pumps use case-hardened bearings

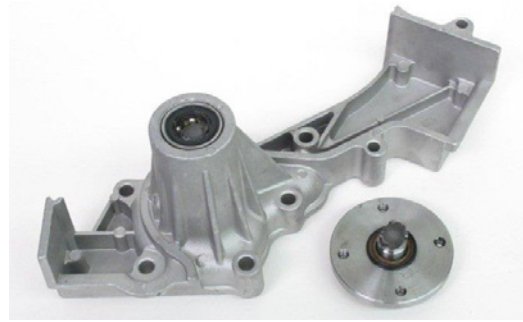


Failure Analysis

Water pumps may fail for different reasons. Identifying the cause of failure will help determine if a larger problem exists and if the pump can be returned due to product failure.

Bosch can perform failure analysis to uncover problems with a defective water pump. The analysis can identify probable root cause, corrective and preventive action suggestions.

Our highly-trained and experienced quality assurance technicians have extensive information and facts about different types of failures.



Example of a water pump bearing shaft failure



Understanding how to spot and diagnose a failed water pump will optimize the vehicle's performance.