



FAILURE INFORMATION

CAVITATION AND PITTING ON THE CYLINDER LINERS

Description of the Failure

In wet-type cylinder liners, holes and pittings occur in the areas where the liner contact with water, as seen in the figure. (Figure 1)

If the cylinder liner does not properly fit the cylinder block or if it is loose for the cylinder piston dimensions, the explosion at the ignition causes vibrations in the cylinder liner. These vibrations affect the flow of the coolant fluid. In this way, the cooling film on the outer surface of the liner is eliminated at certain areas. Steam bubbles occur on the surfaces, where the cooling film is eliminated, due to low pressure and high temperature. The steam bubbles start to hit the surface, where the film is not present in the liner. Due to the force applied by these bubbles, pieces snap off from the surface, holes and even pittings occur.



Figure 1

Causes of the Failure

- It occurs when used pistons are used again. Used piston is not appropriate for new cylinder liner, it is worn away and a space remains between the cylinder liner and the piston.
- Anti-corrosion materials added into the coolant fluid are not adequate.
- Fluids containing inappropriate coolant fluids (acid water, lime water, sea water or fluids containing hazardous materials) are used.
- Since the thermostat is faulty, the engine cannot reach the required operating temperature and the cylinder and the piston cannot reach the

required temperatures. Therefore, the required expansion cannot be achieved and a space occurs between the piston and the cylinder liner. This space causes steam bubbles and pittings.

- In order to keep the pressure of the cooling system at the required level in the engine block, pressurized radiator caps are used. If the recommended radiator cap is not used, water leaks outside the system and as there is no adequate pressure, the boiling point of the water is reduced. The coolant fluid boils and steam bubbles occur due to the temperature of the cylinders.

Recommendations

- During the engine overhauling operation, the cylinder liner, the piston and the piston rings should be used as a kit and they should be replaced within the same operation. Used products should not be assembled to the engine again.
- Protective materials and anti-freeze should be added into the coolant fluid at the recommended level. Protective materials should be added continuously with small amounts as the vehicle is in use. Furthermore, the protective materials should be replaced in every two years.

- Inappropriate coolant fluids (acid water, lime water, sea water or fluids containing hazardous materials) should not be used.
- The radiator caps recommended by the engine's manufacturer should be used and inappropriate caps should not be assembled to the radiator upon third parties' recommendations.



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