



Cleaning of engine cooling system

At the end of an engine reconditioning job, it is often neglected to clean or check the cooling system. The cooling system may, however, be soiled by engine oil or by deposits of lime or rust (Fig. 1 and 2).

An inspection is not only essential after engine reconditioning work. Even during normal engine operations, deposits in the cooling system by insufficient cooling system maintenance can mean that the cooling of the engine is no longer ensured to the full extent. As a result, the temperature of the coolant may rise, frequently even causing engine overheating with severe piston and cylinder damage.

Proceeding:

The cleaning process is the same for degreasing or deliming the cooling system. The only difference is the detergent to be used for this.

Degreasing the Cooling System:

This is done using a 5% cleaning solution consisting of a mild alkaline detergent and fresh water. Mixing ratio: 50 g of detergent to 1 litre of fresh water.

Deliming the Cooling System:

This is done using a 10% cleaning solution consisting of water and citric acid. Mixing ratio: 100 g of citric acid to 1 litre of fresh water.

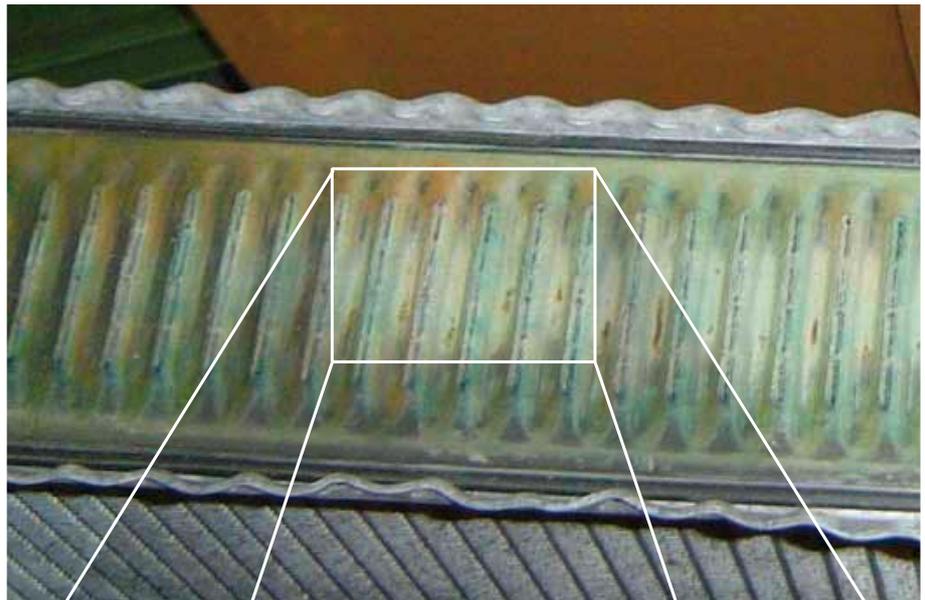


Fig. 1: Water cooler, cut-open

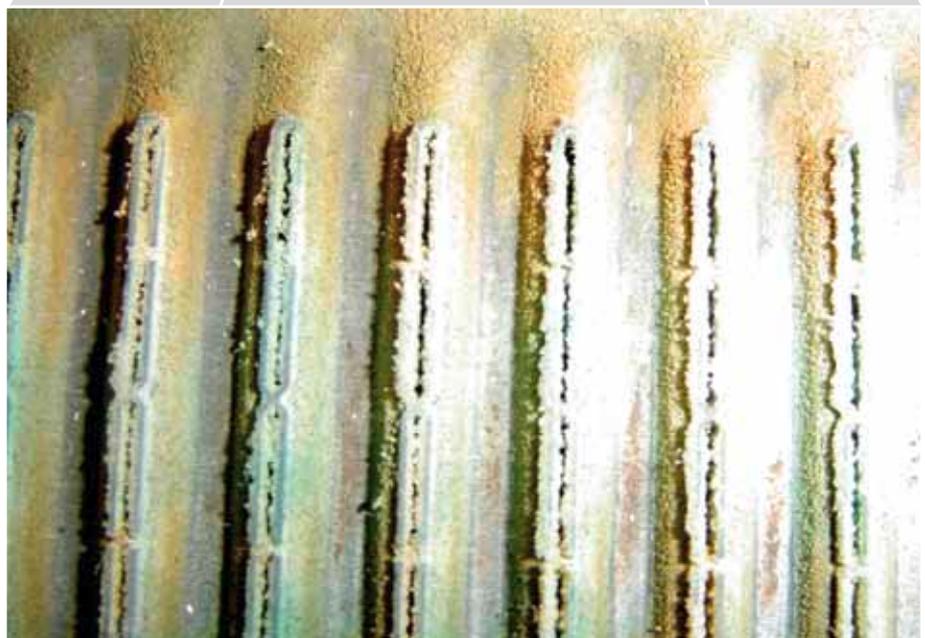


Fig. 2: Calcified cooling channels

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The cooling system is emptied and filled with the cleaning solution. After that, the engine is started and brought up to operating temperature at medium rpm. After the operating temperature has been reached, the engine should run for another 10 minutes. The heater control should be set to “warm” so that the heat exchanger can also be rinsed, if necessary.

After switching off the engine and after allowing the coolant to cool down to approx. 50° C, the cleaning solution is drained off completely and disposed of according to waste management rules. If the deposits have not been completely removed, the process should be repeated until all de-posits have been removed. Then rinse the cooling system twice using fresh water; to do this allow the motor to run for about 5 minutes with each rinsing. If both types of cleaning are to be carried out, you should start with the degreasing and completely carry out the deliming.



Fig. 3: Deposits of lime

! It is essential that the cooling system is always filled with the coolant (e.g. ethylene glycol) in its relevant dilution as prescribed by the engine manufacturer. Even in regions with a mild climate without frost, engine coolant (so-called anti-freezer) must be filled in. Adding coolants to the cooling water raises the boiling point of the cooling water and prevents corrosion, lime deposits and foaming inside the cooling system. In addition, it contributes towards reducing wear thanks to its lubricating effects and, consequently, to increasing the service life of the coolant pump. Ethylene glycol or other coolants should not be filled in the cooling system undiluted, since this may result in a reduced cooling capacity in case of overdosing.

Case of Damage by Corrosion

Figures 4 to 7 show how corrosion in the cooling system can occur in less than a 1,000 km as a result of corrosion and using inappropriate coolant. The damage shown was due to a leaky blind plug (ball cock) on an aluminium cylinder head.

Photos 5 and 6 vividly show the occurrence of electrochemical corrosion on the sealing set of the check ball. The corrosion infiltrated the sealing face resulting in a leak on the cooling system. In consequence, the cylinder head had to be dismantled again to remedy the leak.

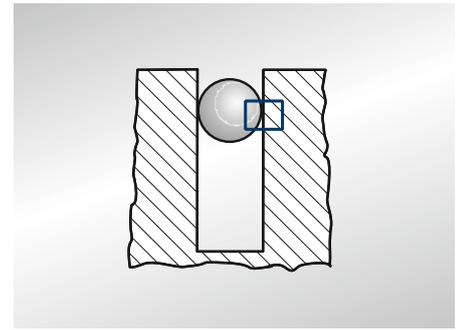


Fig. 4: Ball plug



Fig. 5: Corroded sealing seat



Fig. 6: Sealing seat, magnified



Fig. 7: Check ball