

THEME: CONDENSER CORROSION

BACKGROUND

The condenser is placed in the front of the car and is typically attached to other heat exchangers in the engine compartment. The condenser is crucial for the AC system operation. It ensures that the refrigerant changes from a gas to a liquid form. This is achieved through the condensation process, where the refrigerant heat is extracted and exchanged with the ambient air.

PROBLEM

As one of the AC components closest to the external environment, the condenser experiences extensive tear and wear during its lifetime. Especially climates with a considerable amount of downpour, snow and humidity are rough on the condenser. As the roads are covered by salt during the colder months, the saltwater will spray the exposed condenser and increase the risk of corrosion. Often being a deprioritized problem, a corroded condenser will lead to a lack of efficiency in the AC system. The ineffective condenser will increase the workload on other system components, especially on the compressor.

Many compressor claim cases reveal that a condenser with restricted efficiency was reason for the compressor to overheat and in consequence to seize.

RECOMMENDED SOLUTION

Regular visual inspection of the condenser surface can save you from expensive system and compressor repairs. Any signs of corrosion or leaks on the condenser surface must be considered as serious threats for the system efficiency and operation.

Especially, pay attention to the condenser bottom part, where tubes and fins are mostly exposed to extensive humidity and aggressive salt spraying. Oil residues on the condenser indicate leaks. Always replace a condenser that is leaking or has missing/deteriorated fins.

When replacing condensers, choose parts with corrosion protection applied. This prolongs its lifespan considerably. Advanced saltwater tests have shown that condensers that are treated with corrosion protection can function up to eight times longer than a non-protected condenser. Nissens applies special protection to +500 condenser models particularly exposed to corrosion.

CONDENSER CORROSION - POSSIBLE ISSUES



Deterioration of condenser fins – Even if the condenser does not leak and seems to be tight, the heat exchange capacity can have been reduced significantly. As corrosion attach to the thin aluminum fins, the working surface area is reduced, which will reduce the overall heat exchange capacity of the condenser.



Lack of fins – As the fins corrode over time, they will fall out of the condenser. With the number of fins reduced, the condensation process will become significantly more ineffective, creating an increased overload on the compressor. **Removal of only one fin row from the condenser can reduce its thermal performance by up to 3%!**



Leaking condenser – Testing has shown that a condenser with missing fins, due to corrosion caused by saltwater, will eventually start to leak. The leakage is caused as the lack of fins destabilizes the condenser construction, making it more vulnerable to wear and tear. As the refrigerant disappears, the system will not function properly. Furthermore, as the lubricant cannot be distributed in an empty running system, the compressor will be exposed to overheat and seizure.



Visibly deteriorated condenser fins



Several rows of missing fins caused by condenser corrosion



Leakage caused by missing fins



Seems tight, however, a condenser in such a condition cannot perform well and must definitely be replaced

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