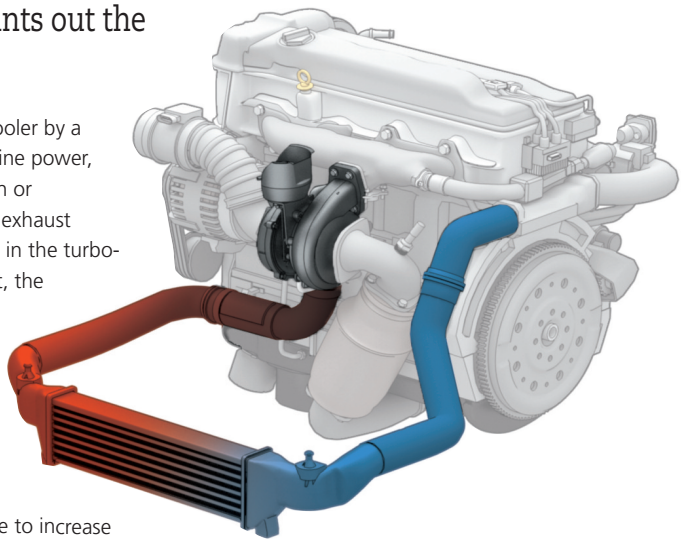
Turbo intercoolers under pressure

A significant portion of the current car parc is fitted with a turbo and that will continue to grow. With an increased focus on the environment, as well as greater attention to engine downsizing and fuel economy, the intercooler is being pushed to the limit. Nissens points out the problems this has created and what to look out for.



Engines are becoming more and more efficient, with every part of the engine being optimised and pushed to the limit. While the use of turbocharged engines generally provides a number of benefits, such as increased engine power and efficiency, lower fuel consumption, lower engine emission values and less thermal stress on the engine, previously infrequent engine issues have become more and more regular, and new ones will occur, as the systems are being pushed to their limits.

Since its introduction more than 30 years ago, the turbo has been decreased to half the size, but has doubled in RPM and pressure, while the temperature has been increasing to gain the desired effect. All of this increases the pressure on the intercooler, as the difference between the input and output air temperature of the intercooler is increased. Eventually, this will cause an increase in intercooler failures.

What are the issues?

While product failures caused by stones and particles from the road, causing external damage and leakage to the intercooler, are currently the main cause for issues, two other issues are increasing in appearance with the spread of turbos:

- Clogged intercoolers
- Leaking intercoolers due to abnormally high system pressure

Mechanics and drivers can often identify a defective or leaking intercooler by a noticeable drop in the engine power, increased fuel consumption or unnatural smoke from the exhaust system. While the pressure in the turbo-charged system is incorrect, the air/fuel mixture will have an insufficient amount of oxygen, causing the engine power to decrease. This loss of oxygen in the system will affect the combustion process, causing the vehicle to increase fuel consumption. As a result of this effect, unnatural smoke will develop in the exhaust system, as the increased amount of fuel in the system cannot be combusted and leaves through the exhaust. To compensate for this effect, even more pressure is put on the turbo to compensate for the missing air, which can ultimately drive the turbo to failure.

What can you do?

If you install a new turbocharger, without also examining the intercooler, the system may run at excessively high-pressure, where oil and particles that have accumulated in the intercooler are at risk of being blown into the combustion chamber. If this debris enters the combustion chamber, then they are at a great risk of damaging the engine.

For this reason, Nissens recommends that an intercooler should always be replaced after a turbo has failed, in order to ensure that the intercooler is free from excessive oil, metal or other particles. left over from the failure of the previous turbo Additionally, when a new turbo has been installed, all system components must be thoroughly examined to ensure that they are not blocked by oil or metal debris.

Most European car models introduced in the next five years will most likely be fitted with a turbo, making knowledge of the intercooler and turbo relationship more relevant than ever before.

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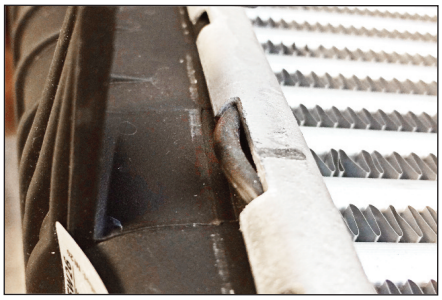
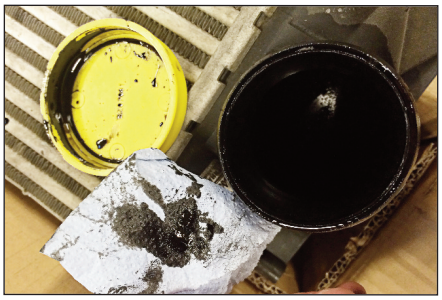


Abnormaly high system pressure can cause deformation of the plastic tank

Pressure damaged fins and excessive oil in the intercooler indicate a system pressure failure



Oil residues clogging the intercooler