

ALL INTERCOOLER TYPES



ALL VEHICLE APPLICATIONS WITH TURBOCHARGED ENGINES AND COOLING OF THE CHARGED AIR.

PROBLEM PREMATURE INTERCOOLER FAILURES

INNER CHANNELS RESTRICTIONS > RESTRICTED AIR FLOW CHARGE AIR SYSTEM OVERPRESSURE > AIR CHANNELS BURST > AIR LEAKS

BACKGROUND

There are several common Intercooler failures and majority are provoked by external factors i.e. other component failures in the charge system rather than by the intercooler itself. In all instances, a faulty intercooler will significantly affect the charge effect thus weaken the engine power output. A malfunctioning intercooler may also increase fuel consumption, cause improper engine emissions and consequently, expose other engine's equipment and engine to severe, premature failures.

A. EXCESSIVE SURFACE CONTAMINATION

OUTCOME

POSSIBLE ROOT CAUSE

Improper heat exchange

- > too high charge air temperature
- > engine failures, i.e. knocking
- > improper engine boost / lack of power

- Oil leaks within the engine compartment soiling the intercooler.
- Careless service/maintenance of the vehicle.

B. AIR FLOW CHANNELS PERFORATION / PIERCING

Charge air leaks

- > improper engine boost / lack of power
- > affected AFR / increased fuel consumption/emissions
- > turbocharger overspeeding – severe damages

- Stones / insects chipping, vehicle frontal crashes, careless service, high-pressure cleaners
- Air channels/tanks bursting caused by overpressure

C. AIR CHANNELS/TANKS BURSTING CAUSED BY OVERPRESSURE

1. Turbo generating too much boost:

Caused by: tuning / increasing manually turbo settings – output, turbo boost control failures e.g. wastegate/VNT mechanism stuck, blow-off valve (BOV) or MAF/MAP sensor issues

- Previously failed turbo residues, splinters and metal chips not removed effectively
- Excessive system contamination – improper air intake filtering, careless service
- Excessive soot built up within the engine intake manifold / EGR system issues
- Oil penetrating the charge system: broken turbo seals, faulty crankcase ventilation system

2. Air flow restrictions within the system:

Caused by: clogged hoses, pipes or inner channels of the intercooler by impurities in the system. These may have the following sources



Many of the charge air system failures are linked/consequential to each other. Ignoring some of the first failure symptoms may lead to severe, unrepairable failures of the other system components and the engine. Example: overpressure occurring in the charge air system leads to improper combustion and may lead to oil intrusion into the charge air system or turbo devastation.

RECOMMENDED SOLUTION

Address the first malfunction symptoms within the charge system and resulting in the improper engine operation.

Always replace the intercooler along with the new turbo installation – obligatorily, when the previous turbo failed due to seizure or compressor/turbine wheels burst.

When installing/replacing turbo or/and the intercooler, thoroughly observe the fitting instruction recommended by the part/vehicle manufacturer.

Before fitting a new intercooler, investigate what caused the replaced part failure. Eliminate the root cause of the malfunction to avoid that the newly installed parts break down instantly after fitting.

When performing the troubleshooting, pay specifically attention to the related systems and peripheral components: engine lubrication, crankcase ventilation, intake air, charge system and its sensing devices (MAF/MAP, turbocharger/boost control (BOV) and charge system ducts, EGR system.

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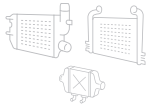
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PICTURES



Oil on the intercooler surface may be source of external or internal system leaks. In any case, a soiled surface disable the heat exchanging properties of the intercooler.



Such a massive oil concentration inside the intercooler is a sign of impaired turbocharger seals or faulty operation of the engine crankcase ventilation. In both cases system thus engine will work improperly.



Blown and burst air channels/tubes as a result of the system overboost/too high pressure.



Mechanical surface damages caused by road-thrown objects will often cause leaks.



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