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TECH TIPS
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Premature Failure of CAC (Charge-Air-Coolers)

Charge-air-coolers are manufactured from aluminum. In order to meet the new emission standards, engines must run hotter. Aluminum becomes unstable at elevated temperatures, which presents a challenge for charge-air-coolers.

Most charge-air-cooler manufacturers use a thin wall tube and a heavy gauge header. Brazing the thin welded tube to the thick header causes dissolution, which means both the tube and the header become thinner, causing pinholes along the tube-to-header joint. As a result, most Original Equipment Manufactures have an acceptable leak-rate of 5 to 7 PSI every 15 seconds, as documented by the "Leak Down Rate Specification" table below.

OEM	Specification
Caterpillar	5 psig in 15 seconds @ 30 psig
Cummins (ISB, ISC, N14)	7 psig in 15 seconds @ 30 psig
Cummins (ISX, M11)	5 psig in 15 seconds @ 30 psig
Detroit Diesel	5 psig in 15 seconds @ 25 psig
International	5 psig in 15 seconds @ 30 psig
Mack	5 psig in 15 seconds @ 30 psig
Mercedes	5 psig in 15 seconds @ 25 psig
Volvo	5 psig in 15 seconds @ 30 psig

Additionally, at increased temperatures, the tube becomes unstable and cracks at the tube to header joint when under stress from twisting and flexing. Premature tube-to-header joint failure is the most common cause of leaks in a charge-air-cooler.

Symptoms of non-performing or underperforming CACs include:

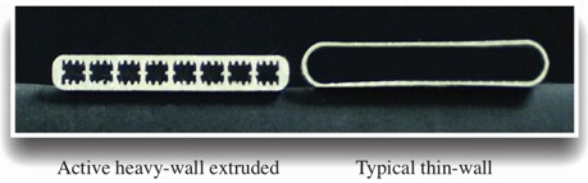
- Loss of engine power
- Increased fuel consumption
- Exhaust manifold failure
- Premature piston, ring, and valve failure
- Elevated coolant temperature
- Turbocharger failure

Some aftermarket manufacturers have addressed the weakness of the tube to header joint with rubber grommets. Viable at the time of introduction, the question is how much service life can you expect from rubber at today's increased temperatures? The Achilles heel of the rubber grommet design is oil contamination. If the turbo fails, oil will undoubtedly enter the charge-air-cooler thus rendering the rubber grommets useless.

Addressing The Causes of Premature Failure

Extruded Tubes

Active's exclusive design heavy-wall extruded tube is at the heart of every OE-Premium charge-air-cooler. The structural integrity of this extruded tube increases the columnar strength while reducing the harmful effects of twisting and flexing.



Active heavy-wall extruded tube | Typical thin-wall welded tube

Headers

Flanged headers manufactured from high-strength high-temperature alloy provide long service life.

Cores

Brazing our heavy-wall extruded-tube to our 1/8" high-strength alloy headers in our proprietary controlled-atmosphere brazing-furnace creates the strongest tube-to-header joint in the industry. Period.

Active Heavy-Duty Cooling Products

In order to address the needs of Heavy-Duty applications, Active offers our OE-Premimum™ brand of charge-air-coolers; featuring a two-year, unlimited mileage, nationwide warranty with labor paid.