

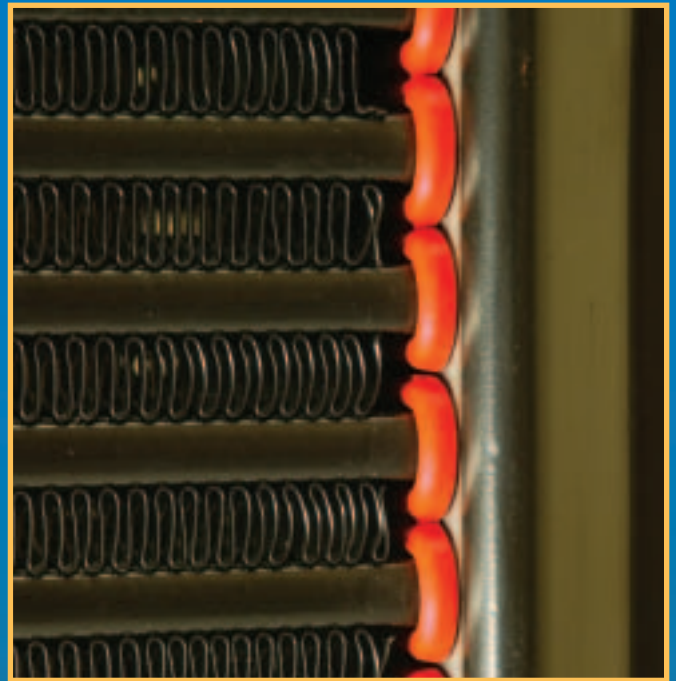
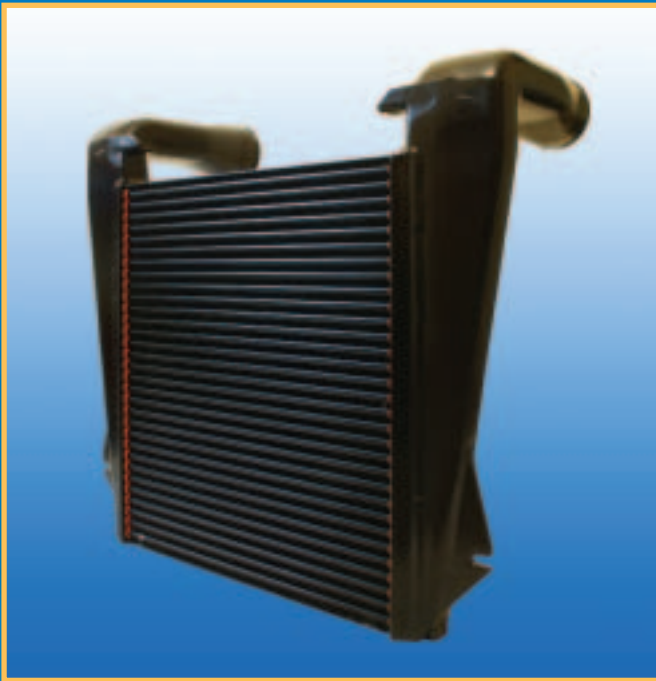


AIR RADIATORS

HEAT TRANSFER AND
AIR MOVEMENT SOLUTIONS

ULTRA•SEAL[®]

Heavy duty charge air coolers



Groundbreaking design eliminates premature failures of charge air coolers.

Unique silicone grommet system provides leak free operation and extended service life.

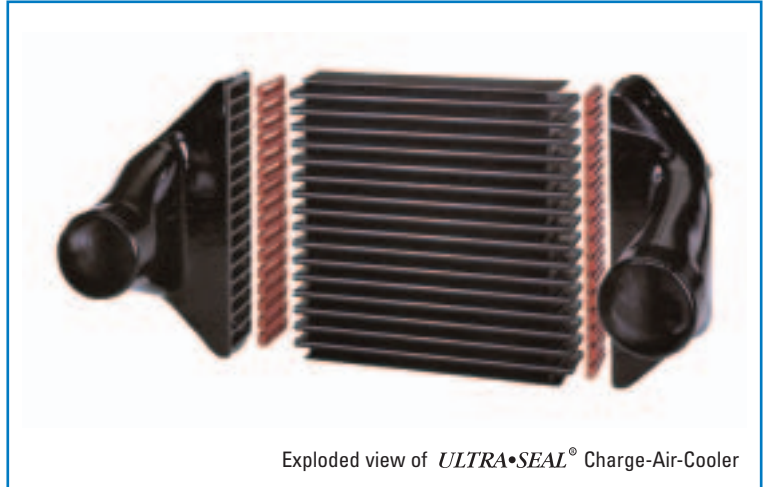
Cuts vehicle-operating costs by significantly reducing down time.

Matches or exceeds original equipment cooler performance.

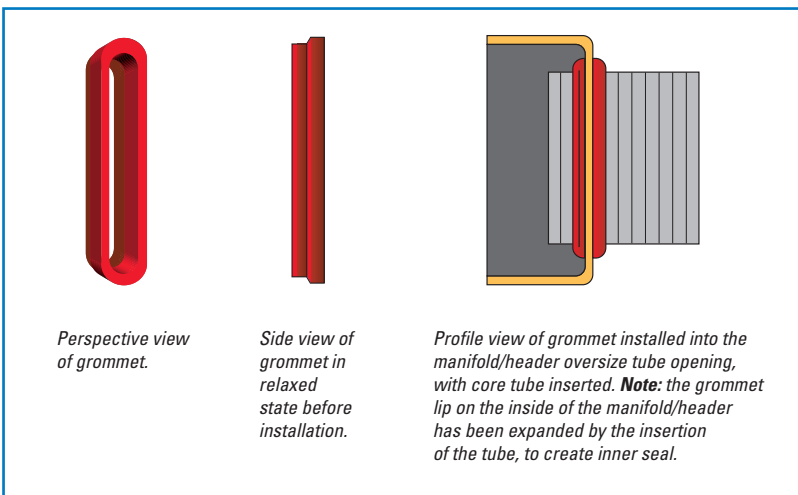
Background

Conventional brazed charge air coolers are prone to a relatively short service life as a result of failures in tubes, tube to header joints, headers and manifolds.

These premature failures are usually the result of excessive stresses, caused by the effects of thermal expansion, cyclic internal pressures and mechanical loads such as racking, twisting and vibration, which is often associated with on-highway vehicles such as trucks and buses.



Exploded view of *ULTRA•SEAL®* Charge-Air-Cooler



Perspective view of grommet.

Side view of grommet in relaxed state before installation.

Profile view of grommet installed into the manifold/header oversize tube opening, with core tube inserted. **Note:** the grommet lip on the inside of the manifold/header has been expanded by the insertion of the tube, to create inner seal.

The Solution

To address the deficiencies of conventional (brazed) charge-air-coolers the *ULTRA•SEAL®* design has been specifically developed to cater with the high in-service stresses.

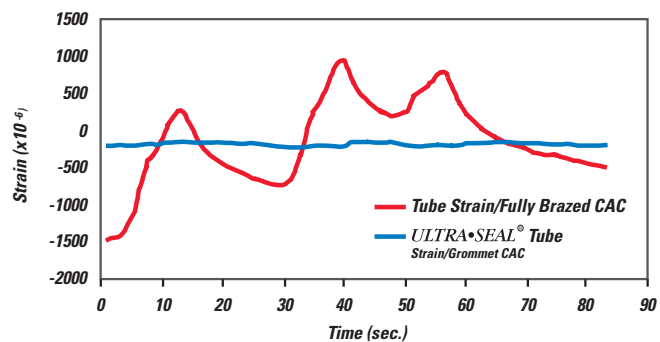
ULTRA•SEAL® overcomes the effects of these operating stresses by utilizing a unique resilient tube to header system (grommets) that isolates the core from the manifolds, virtually eliminating areas of high stress.

Strain Activity Comparison

The graph on right shows strain level (unit deflection of charge air cooler tubes) at the tube-to-header joints of two different charge air coolers in a heavy duty cement mixer truck as a result of job site starts, stops, and accelerations. The jagged curve indicates widely varying strains in a fully brazed charge air cooler. The steady (non varying) curve shows the lack of strain response of the grommeted charge air cooler during similar events.

This lack of strain response activity indicates a theoretically infinite life for the charge air cooler.

Air-to-Air Charge Air Cooler Strain Activity Comparison Graph



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