Fuel Cell Standards

XVII. Cathode Subsystem

XVII.e Charge Air Cooler (CAC)

Overview:

Classroom and lab topics

- Primary functions of the charge air cooler
- Types of heat exchangers- air to air, liquid to air and liquid to liquid
- Delta- T considerations for heat dissipation
- Faults caused by air flow restriction in the cooler
- Faults caused by inadequate temperature reduction

Description:

After the incoming air is compressed it must be cooled substantially to avoid damage to the stack membrane. This is accomplished using a heat exchanger similar to an intercooler found on some ICE engines. For efficiency, packaging and fast throttle response these are usually air to liquid heat exchangers using coolant and a liquid to air heat exchanger located somewhere else in the vehicle to remove waste heat.

Outcome (Goal):

Student will be able to explain the functions of the charge air cooler

Objectives:

Students shall be able to:

1. Identify air leaks and repair
2. Identify coolant leaks and repair
3. Locate, inspect and replace the charge air cooler

Tasks:

Students will

1. Explain proper charge air cooler operation
2. Follow the coolant flow path through the system
3. Use IR meter to determine CAC inlet and outlet temperature
4. Locate, remove and replace the charge air cooler using OEM instructions
5. Use OEM service instructions to identify any preventative or periodic maintenance

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To comment or offer suggestions on this standard, contact Ken Mays:

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