EGR Cooler Cleaning Solution Evaluation – HZ EGRCC2

Cleaned 2/23/2012 & 2/24/2012

Kim McKinnon,
Paccar Technical Center ETL
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Background

- PTC was requested to evaluate new cleaning solution for EGR coolers
- PTC to evaluate proposed solution using PACCAR EGR Cooler Cleaning Kit & Directions, PN#8662381 & 2 gallons of HZ EGRCC2
- Due to nature of EGR fouling processes – side by side comparison of cleaning solutions is not feasible.

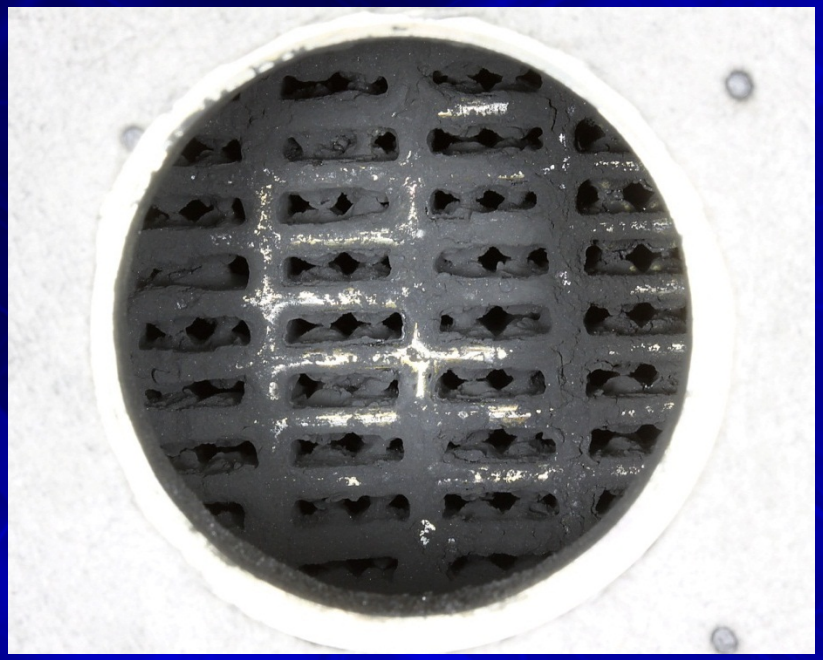
Test Procedure

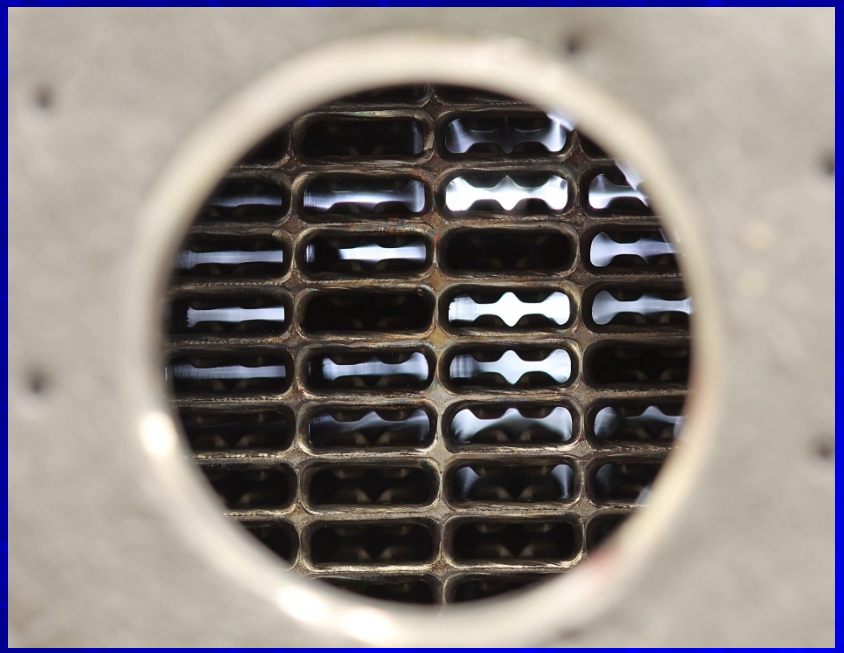
- Selected 3 coolers w/moderate to severe fouling.
- Coolers were pressure tested to ensure no coolant side leaks.
- Cleaning performed per kit directions
- A new set of venturi sensors was used for each test to evaluate impact of cleaning procedure on the sensors. Sensors will be sent to PEC for coordination with sensor manufacturer

Inspection Methodology

- Before cleaning - Each cooler was visually inspected for degree of blockage through visible channels.
- After cleaning - Each cooler was visually inspected for degree of blockage.
- After photos were backlit to show degree of cleaning because inspection of face not sufficient to evaluate “clean”.

Test Sample #1
Case ID 2674774, 2/7/2012 -73961 miles





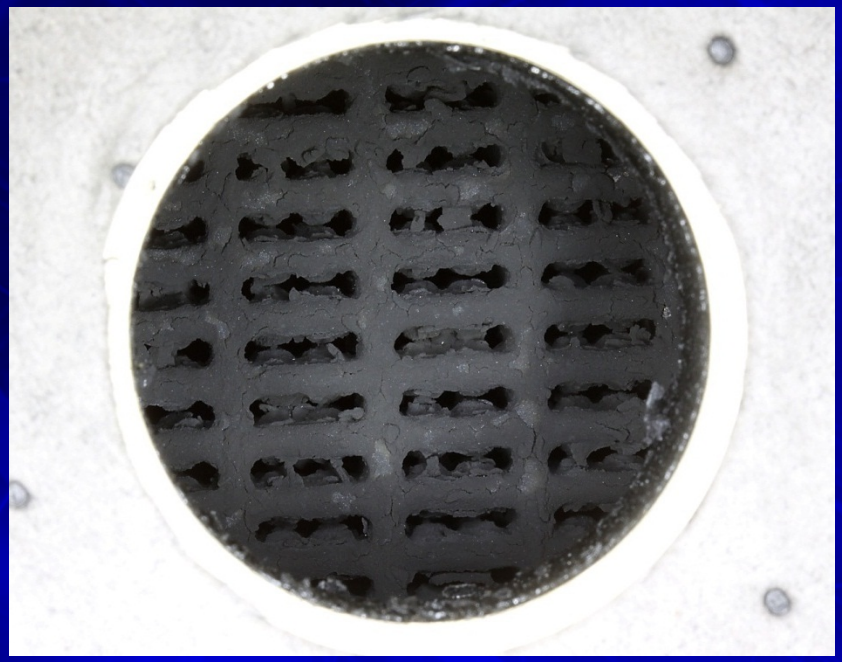
	#blocked	#restricted	#clear
Before	36	0	0
After	0	0	36

Test Sample #2
Case ID 2566529, 9/13/2011 – 18806 miles

	#blocked	#restricted	#clear
Before	0	36	0
After	0	0	36

Test Sample #3
Case ID 2672579, 2/3/2012 – 33228 miles*

- Support Net indicates this is the 2nd EGR cooler for this vehicle. Replaced previously @ 14892miles



	#blocked	#restricted	#clear
Before	36	0	0
After	0	0	36

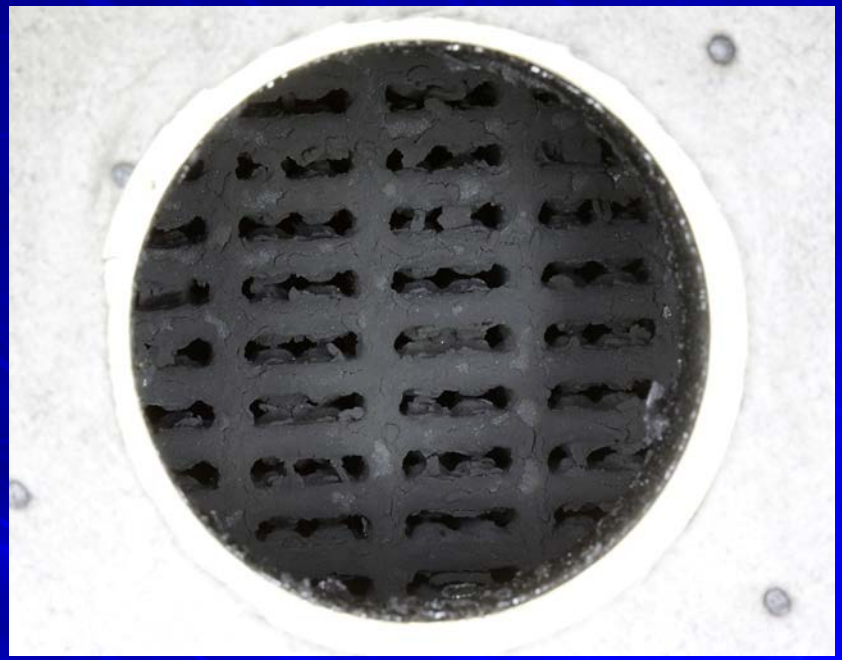
Comments

- The kit cleaning procedure is different than the procedure originally tested at PTC
  - Flow direction reversed
  - Cleaning time at minimum value recommended
  - Venturi included in cleaning path
- EGR Cooler inspections not in directions
  - Inspection before cleaning to determine if feasible
  - Inspection after cleaning to verify clean
  - Both inspections require removal of venturi

Evaluation before cleaning to determine if cooler can be field cleaned

Soft powdery deposit – experience has shown this is cleanable

Hard, cracked deposit – experience has shown this requires longer cleaning



There is a wide range of values in between with varying degrees of clean ability.

Conclusions

- New cleaning fluid, Hydro-Zone EGRCC2 was able to remove build up in the EGR cooler test samples.
- Longer cleaner circulation time may be required for complete cleaning of some coolers.
- Some coolers will require longer cleaning and higher concentration of EGRCC2 to be cleanable due to the physical properties of the residue.