

GMCWS Fall 2012 Rally



My Engine Cooling Saga

Saga? It's a long story.

Saga – because it's a long story

- In early 2010 everything was stock until...
- I installed a NAPA temp sender and...
- Saw that my OEM gauge now showed hot so...
- I installed a calibrated mechanical gauge and saw that...
- My engine was running as hot as 240 so...

I started changing things

- New 195-degree fail-open thermostat
- New AC Delco 15-4644 severe-duty fan clutch
- New aluminum radiator
- Test drive shows that temps are much better so...

We left on our 7,500 mile trip

- Left Arizona home in 110° heat
- Drove to Kansas City in 100-110° heat
- Noise was deafening
- Fan on 70-90% of the time (measured)
- Tried removing fender liner – no help
- Wife says fix it or take me home

Fixes and other things

- Installed Hayden 2797 in Kansas City
- Fan still on all the time but much quieter
- Thermostat failed (open)

Aside: Fan clutches and fan speeds

- Steve Ferguson's seminar "Engine Cooling Basics" – fan clutches
- Good data for disengaged fan clutches
- Incomplete data for engaged fan clutches
- Logical: louder fan means higher speed
- Logical: quieter fan means clutch must be slipping more since engine speed same
- Standard-duty vs. severe-duty = more slip

The \$64,000 question:

- Why does the fan clutch engage at highway speeds even when not needed?
- Cars don't do that.
- Fan clutches are not intended for that.
- Why isn't the air coming through the grill enough?
- Fixing that would solve my problems.

When is the fan not needed?

- I had no thermostat – failed open
- Cool morning air at less than 72°
- Engine running at less than 150°
- Driving at 50 MPH so plenty of air flow
- Fan clutch engages!
- Why?

What is making the fan clutch engage?

- What heat source in that engine compartment is hot enough to cause the clutch to engage?
- Answer: The exhaust manifolds or headers!
- The air in the engine compartment is being heated and somehow getting in front of the fan clutch.
- Conclusion: The air is swirling around and not flowing through the engine compartment.

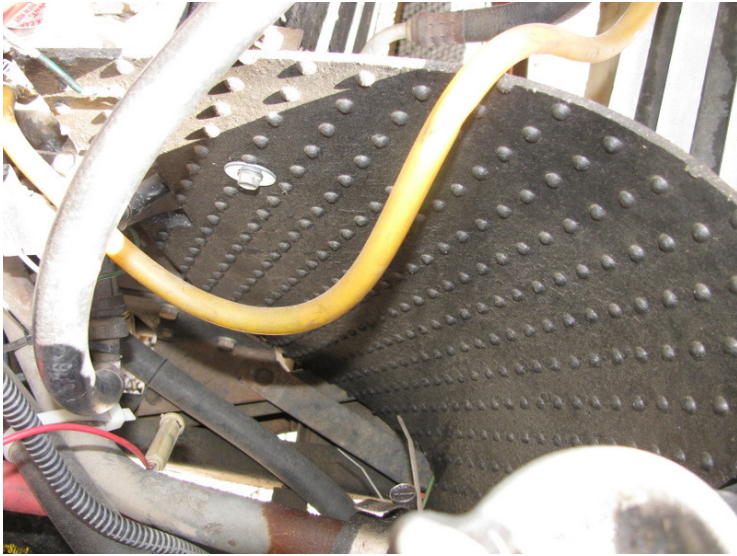
Fan clutch failed and replaced

- After only about 3,000 miles the Hayden 2797 failed. Because it is always on?
- At first it was intermittent – then stuck on
- Could not find O'Reilly in Lubbock, TX so bought AutoZone 922747 (Hayden 2705?)
- Standard duty clutch for Olds 403 quiet and it works – still working after 13,000 or more miles (because the air flow problem is fixed?).

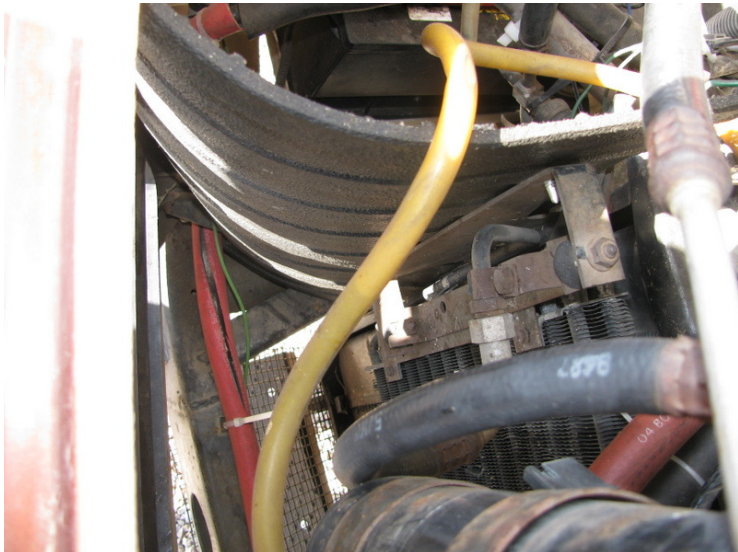
Air flow control fixed the problems!

- Made deflectors for left and right sides of radiator – to force air through the radiator
- Made an air-dam or ‘spoiler’ for under radiator – to force air up and pull air out
- Sides constructed with 18-wheeler mud flap from local truck stop
- Air dam constructed from angle iron (now) and more mud flap material

Passenger side deflector



Passenger side outside – grill is at top right in photo. Used a bolt to attach it to the side of the radiator bracket in one place. Front is not secured.



Passenger side inside – grill is at left in photo.

Driver's side deflector



Driver's side outside – grill is on left and top of the photo. Deflector is held in place by the same bolt that hold the hydraulic line to wiper motor. Front is not secured.



Driver's side inside – grill is on right in photo. Oil dip stick is between deflector and radiator bracket.

Air Dam or Spoiler



Air dam from left-front. Mud flap material is screwed to support bar.



Air dam from left-rear. Flat 90° corner braces bent to 135° and screwed to bottom of radiator bracket.

Air Dam/Spoiler Revised



Now constructed with galvanized angle iron – angle not quite right but under-coach vacuum probably better.

