

Transaxle Cooling

Posted by AgRacer - 20 Feb 2014 17:43

Has anyone taken advantage of the new rule allowing transaxle cooling?

Ive started to develop a setup and got a quote from one source that included pump, filter, and cooler with fan that scavenges off the drain plug and returns through the fill plug.

The source seemed to agree that its not a lubrication issue for us but rather a heat issue that kills the bearings holding the ring and pinion. He seemed knowledgeable on our transaxles and also made a good point that particles off the LSD clutches can add to wear, which is why he recommended a filter. Any temps over 220-230 were said to be too high, and that's under what some reports on here were saying they were seeing.

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Re: Transaxle Cooling

Posted by RacerX - 02 Apr 2014 09:37

Big Dog wrote:

Having hot oil in the spare tire area exposes it to damage in a rear ender and hot oil can burn if there is an ignition source. As I recall, NASCAR brings air in through NACA ducts in the quarter windows with an oil cooler on the floor of the car inside a sealed box. I never saw where the air exits but assumed it exited through the bottom of the car.

I don't know if that is a great idea either but they seem to use it. I would personally look for a spot that is not as easy to damage.

Big Dog

Isn't the floor an external body part? So cutting holes in the floor for venting the cooler would be illegal.

12.8.4 Any opening cut into the unibody for ducting to these units shall be kept to the minimum dimension necessary, not serve any other function, and not compromise the strength of the unibody. No modifications of the external body panels are allowed for these purposes.

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Re: Transaxle Cooling

Posted by RacerX - 02 Apr 2014 11:38

joeblow wrote:

I have been offline for a while and as one of the loudest voices for this new rule I want to chime in.

There are lots of ways to do this, some better than others and as you would guess with differences in cost.

The Hard/Expensive way:

This entails a multi-pump set-up or at least multi-stage. You can run a gear driven pump off the driveline of the car (axle or torque tube) which has the benefit of matching pump output with RPM and can be a multistage pump (like a dry sump pump).

The pickup off the tank then has the second pump or stage pull oil out to a multi-discharge return with nozzles spraying oil at the gear mesh points along the tranny (6 points for a 5spd). Critical is the R&P mesh point and to a lesser extent the rest of the gear pack. Nozzle diameter controls the flow to each point. The benefit here is that the oil aeration is controlled and oil is sprayed where it is needed vs all over the place as with a wet sump set-up. Cost \$2000

I will be running a Tilton pump with a single pickup in the drain plug, AN fittings with AN stainless lines (for the safety of it) and one well placed return to spray the R&P (I may add one more in the tail cone but not sure yet). The cooler will be a Setrab unit of reasonable size with no fan just some ducting to it and from it. I can do this for \$400 or so. It will take me less than a day to hook it all up (If I can find the time! Still need to do the cage for crying out loud!).

Again, I don't believe what your talking about here is legal. It must be an external pump. No gear drive off the transaxle. And I would think that drilling holes to put spray jets in would also be illegal.

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Re: Transaxle Cooling

Posted by joeblow - 02 Apr 2014 14:18

12.8.2 Any external transmission oil cooler, and external transmission oil pump may be added.

The mechanical pumps I am talking about are **externally** driven off the drive axle. This meets the rule above. Further there is no mention of the number or type(s) of return(s) for the oil, and since there is no performance gain by multiple returns, only longevity improvement, I cant see why it would matter?

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Re: Transaxle Cooling

Posted by joeblow - 02 Apr 2014 14:23

12.8.4 Any opening cut into the unibody for ducting to these units shall be kept to the minimum dimension neccessary, not serve any other function, and not compromise the strength of the unibody. No modifications of the external body panels are allowed for these purposes.

Clearly we are talking unibody when we talk about the interior metal such as the rear floor and as such the quoted rule is pretty clear in that area. The 'external' body panels are those viewed from from exterior of the car and would include the licence plate area between the taillights so that would be a no go.

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Re: Transaxle Cooling

Posted by RacerX - 02 Apr 2014 15:12

1.2 944-Spec is a restricted class. Therefore no modifications/changes are allowed unless specifically outlined in these rules.

I don't see in the rules where we can cut the floor to vent a cooler or drill holes in the transaxle for multiple oil return lines. Powers that be may see it otherwise but that is how I see it. The rule intent was to just cool the transaxle fluid, not make it a Borg like creature with oil lines running all over.

A simple electric pump that draws oil from the drain sends it through a cooler and returns it through the fill plug will suffice in keeping temps down. If you want to get fancy, add a thermostat and magnetic filter.

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Re: Transaxle Cooling

Posted by AgRacer - 02 Apr 2014 16:46

Ooooh goody, a words mean things debate. Everybody interprets these things differently and I live in this world at my job, so Ive seen how differently one person can read something from another.

When I read exterior, I interpret that the same as joeblow based on the way the term is used in other parts of the rules (look at what 17.1 talks about). I also read the rules to allow a duct through the unibody at the back of the car, on the floor, to an external cooler so long as it is no bigger than is needed to be effective. Cooling ducts in the quarter windows for that cooler are obviously written in as legal in 17.3.9.

I understand that this is supposed to be a simple add on as well, but the way the rule is currently written allows any cooler to be added, however there are still some problems. It doesn't specify what the scavenge and return points should be on the transaxle. Since it doesn't specifically allow drilling into the case of the transaxle to add these ports, I would say its not allowed based on the tone and latitude given elsewhere on other like items/catch all rules. Then again, it also doesn't say that I can use whatever drain and fill plug I want, so by that same logic, the easiest solution is also illegal (using ported plugs for scavenge/return).

Another thing I realized, only external pumps are allowed which makes the turbo mechanical pump/setup illegal.

The likely solution I am going to go with will be to modify my spare tire well as is allowed for people with the plastic tank (which I do). i will then just mount the cooler vertically off that surface along with the electric pump, filter, and thermostat utilizing the stock drain/fill plugs ported for scavenge/return. I think this will be enough.

It was my initial intent to try and source a cheap, effective kit that would be plug and play for most to use in the class, targeted in the \$600 range. Since this is something that more are looking towards doing, it maybe worthwhile next season to talk about a standard kit sold by one merchant that would be the only allowed cooler kit. Many of the other Spec classes have some of these type kits that if you decide to use it, you have to use this one product.

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