

Installing a fan in the SW20 Turbo engine lid

Posted by Marty J - 2011/07/19 12:36

I found this which I thought looked helpful.

http://i67.photobucket.com/albums/h295/MartyJ1/fan_page001.jpg

http://i67.photobucket.com/albums/h295/MartyJ1/fan_page002.jpg

http://i67.photobucket.com/albums/h295/MartyJ1/fan_page003.jpg

http://i67.photobucket.com/albums/h295/MartyJ1/fan_page004.jpg

http://i67.photobucket.com/albums/h295/MartyJ1/fan_page005.jpg

http://i67.photobucket.com/albums/h295/MartyJ1/fan_page006.jpg

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Re: Installing a fan in the SW20 Turbo engine lid

Posted by ricky2 - 2011/07/19 18:41

I would like 1 of the twin fan kits in chrome B)

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Re: Installing a fan in the SW20 Turbo engine lid

Posted by spurs mr2 - 2011/07/19 20:14

im with ricky on this one!there not that expensive either,emspowered have the full kit for sale.http://www.emspowered.com/storefront/index.php?main_page=product_info&cPath=61_62_64_113&products_id=305

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Re: Installing a fan in the SW20 Turbo engine lid

Posted by dan - 2011/07/19 20:33

I've got the twin SPAL fan kit on my car and it's a great bit of kit. Bought it from Gtech over on IMOC in a group buy a few years back. Mine is manky at the minute but it's going to get a good clean up now it's off the car.

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Re: Installing a fan in the SW20 Turbo engine lid

Posted by Spanky - 2011/07/19 22:30

Do the fan kits make much difference to the temp in the engine bay?

I can see how they would help when stationary but when driving there would more air movement caused by the air being forced in through the side vents and out through the engine cover, thus rendering the fans fairly useless.

The twin chrome setup does do look pretty though ...

<http://i797.photobucket.com/albums/yy254/markspence/JAE2010/DSC01739.jpg>

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Re: Installing a fan in the SW20 Turbo engine lid

Posted by spurs mr2 - 2011/07/19 23:04

id say there more cosmetic than practical but they do look good!

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Re: Installing a fan in the SW20 Turbo engine lid

Posted by Harper - 2011/07/19 23:32

So say rogue....

The Revision6 'professional' engine bay fan kit is designed to complement the MR2's airflow by pulling hot air from the engine bay through the slotted engine bay cover. The kit is equipped with two 10" Spal puller fans, each capable of flowing 640 cubic feet of air per minute, and testing shows that it will reduce the engine oil temperature by around 4 degrees centigrade.

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Re: Installing a fan in the SW20 Turbo engine lid

Posted by Spanky - 2011/07/20 00:45

Harper wrote:
So say rogue....

The Revision6 'professional' engine bay fan kit is designed to complement the MR2's airflow by pulling hot air from the engine bay through the slotted engine bay cover. The kit is equipped with two 10" Spal puller fans, each capable of flowing 640 cubic feet of air per minute, and testing shows that it will reduce the engine oil temperature by around 4 degrees centigrade.

That's a v small volume of air, less than 1 litre per second ... you could almost breath heavier. I think these would offer more of a restriction to air flow rather than assisting but whatever the effect it is minimal.

Worth buying for the looks but not worth buying for any unsubstantiated claims on performance.

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Re: Installing a fan in the SW20 Turbo engine lid

Posted by Marty J - 2011/07/20 01:11

I have read the debates about the effectiveness of these fans on other MR2 sites and the majority of people would say that the fans do help to extract more heat from the engine bay than no fans being there. I would not have placed the thread here if I did not believe that they helped cool the engine bay, by how much I don't know. Are they worth the money, that's up to the owner of the car.

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Re: Installing a fan in the SW20 Turbo engine lid

Posted by spurs mr2 - 2011/07/20 06:41

thats true marty its a mod i plan on doing sometime in the future! ;)

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Re: Installing a fan in the SW20 Turbo engine lid

Posted by Spanky - 2011/07/20 14:32

While you are all free to believe whatever you wish the facts are:

The negative pressure created above the engine lid is unchanged by this mod, but the area for air to flow through the lid is reduced by (at least) 50% - see pic, the usable area is drastically cut down from standard with additional obstructions i.e. fan blades, motor and inner grille...

<http://www.roguesystems.co.uk/images/312/04.jpg>

Ignoring the contribution of the fans for now, this drastically reduces the amount of air that is able to flow from the engine bay through the lid as the air pressure would have to be significantly increased (internally) or decreased (externally) to compensate for the increase static pressure that the smaller opening and additional obstructions presents.

The fans will compensate for this only slightly. The figure quoted for air flow is in open air and gives no indication of the actual performance of the fans under various different dynamic and static pressure scenarios.

A standard 9" wall fan (Vent Axia or similar) will draw about 830cub.m/h (open air). The Rogue fans works out at 18cub.m/h. Basic ventilation rates as British Standards and industry guidlines is equivalent

to about 70cub.m/hr/person in a given space. This gives an idea of how little air these fans are able to move.

Think of bhp and torque in your car. To correlate this to fans the volume flow rate (the 640 figure) is the bhp, but the fans ability to overcome static pressure is equivalent to torque. The fans shown on the Rogue website are low on both counts.

The result of all this is less air flowing through the engine bay and therefore less heat lost.

The only time what I state above might not correct is when the car is stationary or moving slowly in traffic. In this case there is no negative pressure created by the car and air only moves through the engine cover through natural buoyancy i.e. heat rising. Although, even when stationary, the air movement created by the fans would need to be greater that the natural buoyancy would be through a larger opening.

The upshot of all this is that the fans may help with engine temperature at slow or zero speeds but will have a detrimental effect on engine temperature at higher speeds.

For improved engine cooling you would be better ensuring your under trays are there, in tact and securely in place so that air can pass as freely as possible under the car, similar to the diffuser system used in newer cars. This minimises the turbulence and pressure created under the car thus creating a more efficient flow of hot air out through the engine lid, thanks to the increase in differential pressures at top and bottom of engine bay.

The engine lids fan modification is a cosmetic/show car mod only. As long as you know this before buying and are happy with that, or buying for that reason, then it is a great looking mod.

As I said at the start you are free to believe me or not but I do speak with some authority as a Chartered Engineer who has been designing, specifying and maintaining building services systems (including ventilation) for more than 14 years.

There endeth the leason :P

EDIT: just realised that the Rogue fan's flow rate is quoted in cubic feet per minute not per hour. This gives it a figure of 1080 cub.m/hr (open air), not 18 as stated previously (thought it seemed too low). This means it would be more effective during stationary moments than I thought but doesn't change my comments when the car is moving.

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Re: Installing a fan in the SW20 Turbo engine lid

Posted by Quandry - 2011/07/20 15:01

Who needs logic when you have style??

<http://images2.fanpop.com/image/photos/13900000/Private-looks-cool-B-penguins-of-madagascar-13967154-456-351.jpg>

:lol2:

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Re: Installing a fan in the SW20 Turbo engine lid

Posted by Spanky - 2011/07/20 15:09

Quandry wrote:
Who needs logic when you have style??

:laugh:

Why have style then hide it away??? :huh:

The Madagascar penguins would know a thing or two about temperatures more than some others potentially :dry:

<http://www.myfreewallpapers.net/cartoons/wallpapers/madagascar-2-penguins.jpg>

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Re: Installing a fan in the SW20 Turbo engine lid

Posted by SWAGGER - 2011/07/20 20:05

Wow, very scientific and comprehensive Spanky. I can see you in a lab coat while typing that. Very thorough!

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Re: Installing a fan in the SW20 Turbo engine lid

Posted by dan - 2011/07/20 23:26

I realise that these fan kits are mainly for show but they will offer a bit of cooling when stationary as you say.

When in motion though I wouldn't think air flow through the engine bay is that important. There's the radiator keeping coolant in check, oil cooler and intercooler, etc. Obviously you're going to need some flow but its not a high priority.

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Re: Installing a fan in the SW20 Turbo engine lid

Posted by Spanky - 2011/07/21 13:31

dan wrote:

I realise that these fan kits are mainly for show but they will offer a bit of cooling when stationary as you say.

When in motion though I wouldn't think air flow through the engine bay is that important. There's the radiator keeping coolant in check, oil cooler and intercooler, etc. Obviously you're going to need some flow but its not a high priority.

When the car is stationary it's not running as hot so cooling isn't as much of an issue unless you are sitting for a long time.

When you are moving, especially in a turbo, the amount of heat produced is immense. I think the exhaust system on a turbo can reach temps well above 500 degrees.

If air flow through the engine bay wasn't considered important then why would Toyota design the entire rear of the car around getting the maximum air floor from the engine bay the shape of the roof, shape of the spoiler and the lid itself are all designed to create maximum negative pressure.

I guess that after market suppliers of kit would know better than Toyota designers who use 100s of millions of Yen worth of computers, wind tunnels etc etc. Perhaps the same after market suppliers should have helped Toyota when they were in F1 that's why they didn't do so well ;)

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Re: Installing a fan in the SW20 Turbo engine lid

Posted by Marty J - 2011/07/21 14:34

Spanky I respect the fact that you are a Chartered Engineer for 14 years and are giving us your opinions.

The photo you provided with the fans has the rain shield removed which was an obstruction for the hot air to get around. This means that the fans are sucking the air directly out of the engine bay through the two louvers in the engine lid. Before the rain shield was removed, the hot air would have to be pulled by the vacuum around the shield. Even without scientific calculations done, the removal of the rain shield can be compared to removing a lid off of a pan of boiling water.

The other point is, Toyota no matter how wealthy they are, must place restrictions on how much to spend developing a car. They did a good job with the MR2, but people have upgraded turbos and the rest which produce more heat than Toyota designed for. This is why we upgrade other areas of the MR2 as well.

Don't get me wrong, I am not arguing with you, I merely pointing out what I see as the positive aspect of this modification.

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Re: Installing a fan in the SW20 Turbo engine lid

Posted by Snulty - 2011/07/21 18:13

I think they look cool aswell, could be a good upgrade if you have a aftermarket intercooler and shroud on one side restricting airflow on that side, some people are probably running with an arc induction box aswell so have very little air coming through.

for a standard car prob not much point.

these fans seem to be a bit better.

http://www.ebay.co.uk/itm/10-SLIM-RADIATOR-FAN-UPGRADED-COOLING-12V-PUSH-PULL-/400229737802?pt=UK_CarsParts_Vehicles_CarParts_SM&hash=item5d2f8d254a

good how to tho, plan to do it myself sometime!

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Re: Installing a fan in the SW20 Turbo engine lid

Posted by Spanky - 2011/07/21 19:42

Marty J wrote:

The photo you provided with the fans has the rain shield removed which was an obstruction for the hot air to get around. This means that the fans are sucking the air directly out of the engine bay through the two louvers in the engine lid. Before the rain shield was removed, the hot air would have to be pulled by the vacuum around the shield. Even without scientific calculations done, the removal of the rain shield can be compared to removing a lid off of a pan of boiling water.

More like removing a lid that was sitting loosely over the top of the pan or held slightly above it (i.e. minimal obstruction), then replacing it with plate that has two small holes in it. The rain tray sits a good bit below the engine lid and so doesn't compare to the shroud around the fan kit that almost seals off the majority of the slots and limiting the air that can flow from engine to atmosphere.

You have stumbled on the best air flow mod you could do for your engine which is to remove the rain shield totally. This would help with engine bay temp at all speeds and is much cheaper than the fan mod. Though the rain getting in might cause more problems.

Marty J wrote:

The other point is, Toyota no matter how wealthy they are, must place restrictions on how much to spend developing a car. They did a good job with the MR2, but people have upgraded turbos and the rest which produce more heat than Toyota designed for. This is why we upgrade other areas of the MR2 as well.

If you carry out mods that increase the engine bay temp then this is more reason not to install the fans.

Final thought, this is from the same company that supplied (and possibly built) the wonderful corroding headlight conversion kit. Reputation for quality not based on that particular history :silence:

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