

# */// Race Louvers*

Professional R&D - Wind Tunnel Tested - Track Proven

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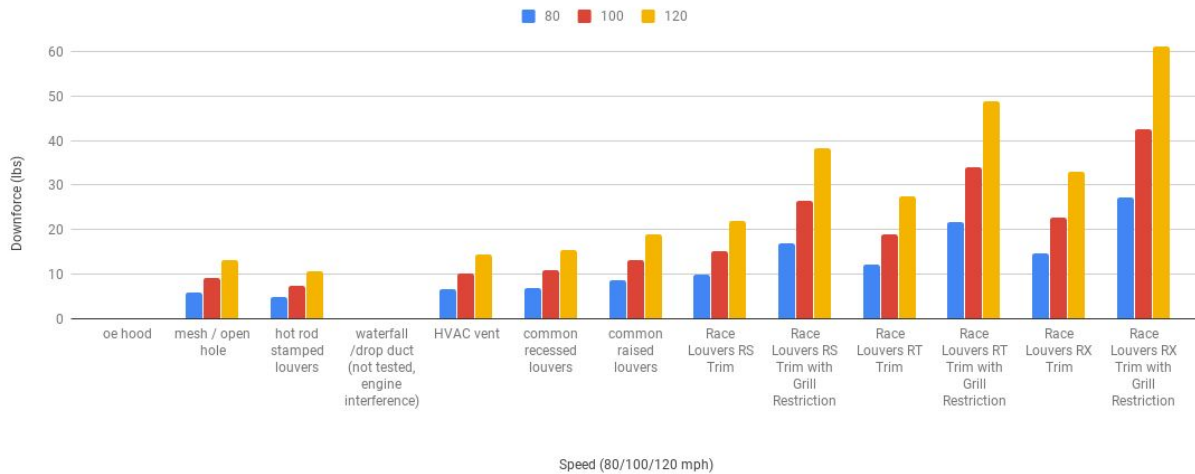
BMW E36 Wind Tunnel Data

Welcome to Race Louvers. Below is some data we gathered from our BMW E36 wind tunnel test car. The data shows Race Louvers again out performing all of the leading competition with more radiator/intercooler cooling and more front downforce. Race Louvers are not simply a vent like most others but are designed to extract air from under the hood. This suction at the rear of the radiator combined with the pressure at the front greatly increases cooling airflow thru the radiator, we call this maximum cooling configuration. This extra cooling allows the user to restrict the front grill to gain even more front downforce, we call this maximum downforce configuration. While other vent designs can tolerate some front grill restriction they generally dont have the extraction capabilities to restrict the grill much without overheating the vehicle.

**Wind Tunnel Front Downforce**

BMW E36, Single 24"x14" Center Vent/Extractor Comparison. OE Grill Opening.

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**Wind Tunnel Front Downforce**

BMW E36, Single Center Extractor with OE Grill vs Grill Restriction vs Dual Extractors with OE Grill vs Grill Restriction

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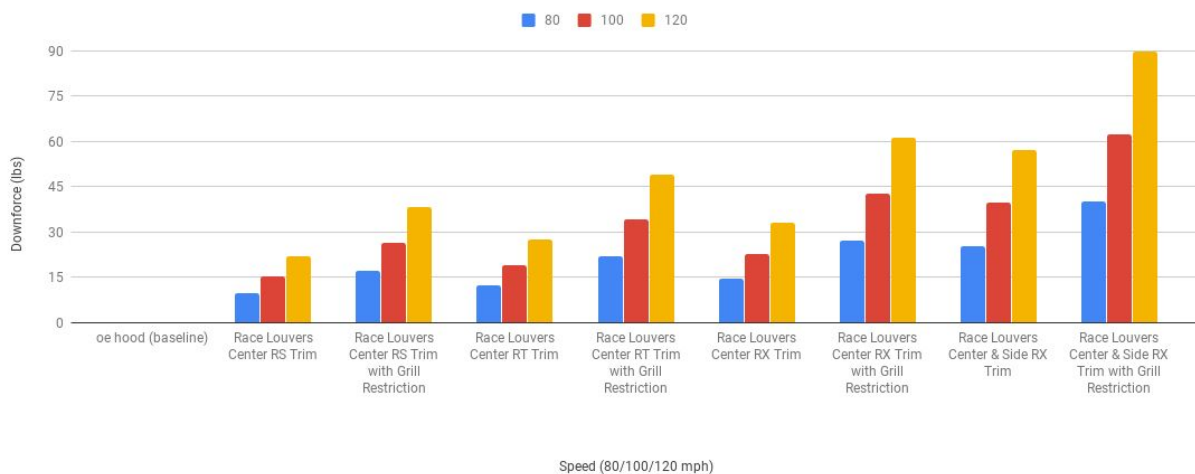


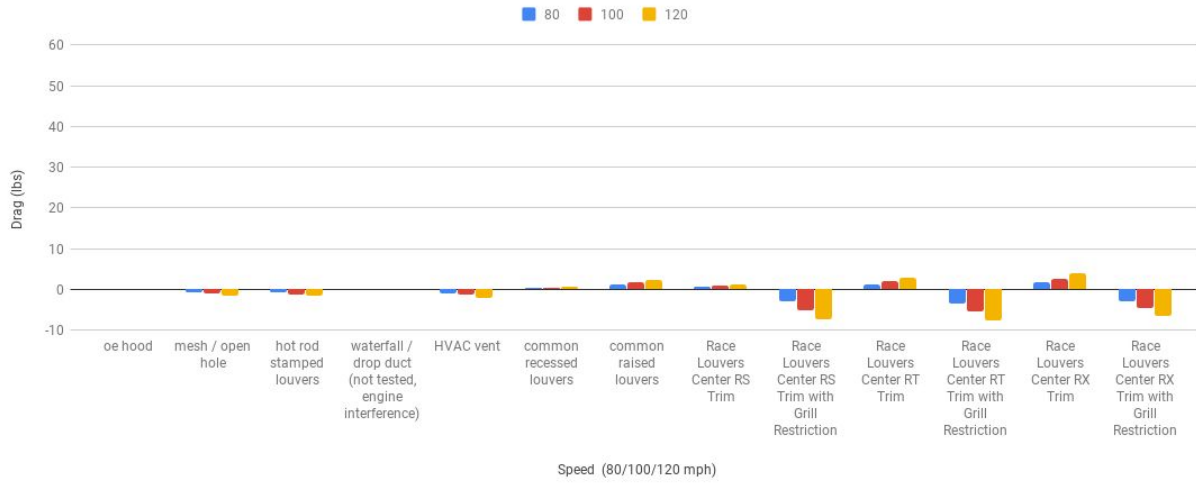
Figure 1 & 2

While most of the competition did have some front downforce, Race Louvers had up to 212% more downforce in maximum cooling configuration and 395% in maximum downforce configuration.

**Wind Tunnel Drag**

BMW E36, Single 24"x14" Center Vent/Extractor Comparison. OE Grill Opening.

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**Wind Tunnel Drag**

BMW E36, Single Center Extractor with OE Grill vs Grill Restriction vs Dual Extractors with OE Grill vs Grill Restriction

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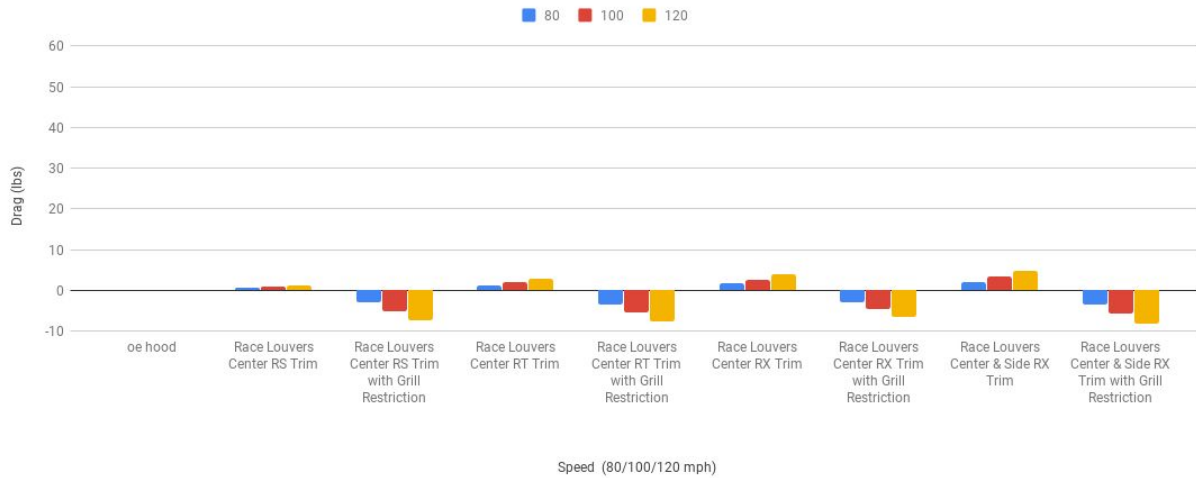


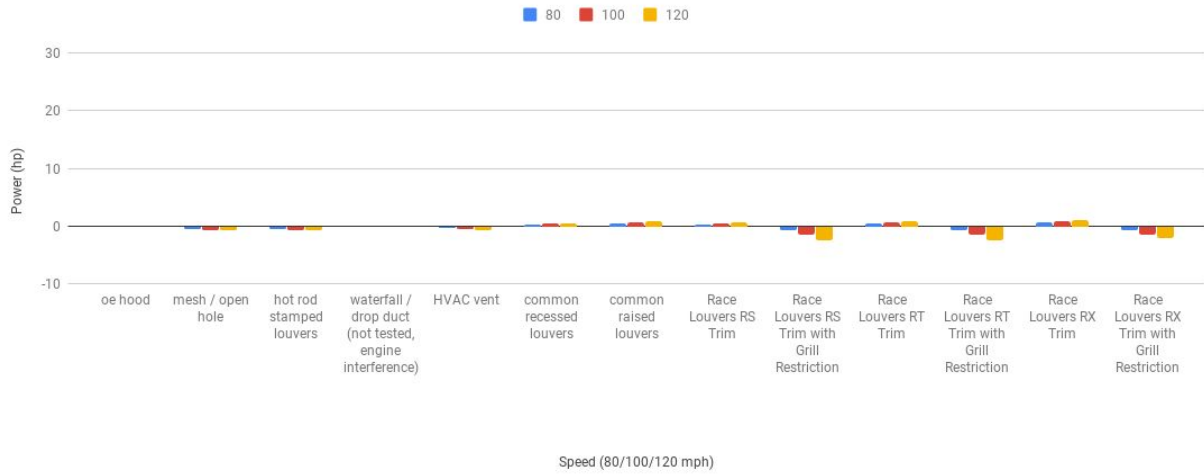
Figure 3 & 4

This shows that Race Louvers come with some additional drag in maximum cooling configuration. This is primarily due to the significant increase in airflow thru the radiator and engine compartment. In maximum downforce configuration Race Louvers actually reduces drag.

**Wind Tunnel Horsepower**

BMW E36, Single 24"x14" Center Vent/Extractor Comparison. OE Grill Opening.

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**Wind Tunnel Horsepower**

BMW E36, Single Center Extractor with OE Grill vs Grill Restriction vs Dual Extractors with OE Grill vs Grill Restriction

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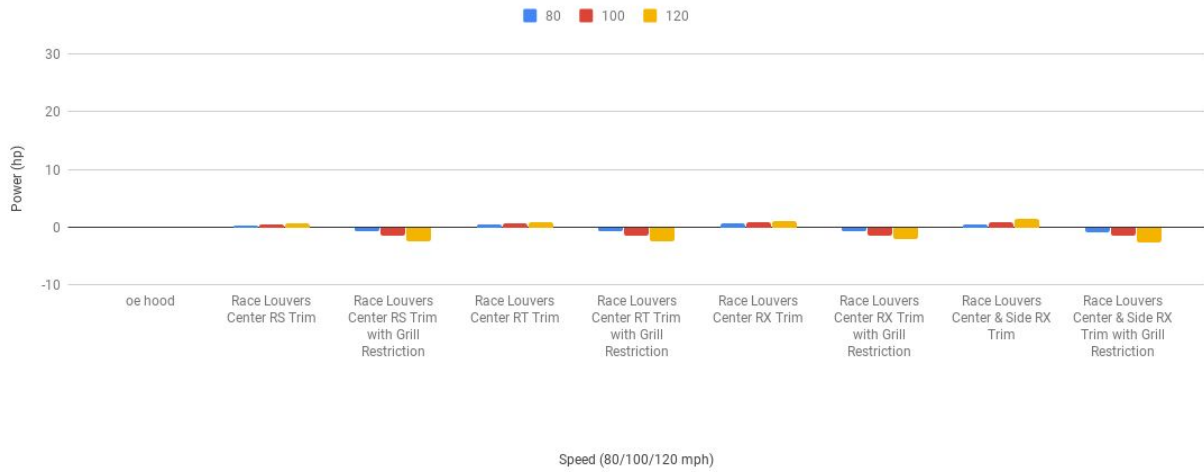


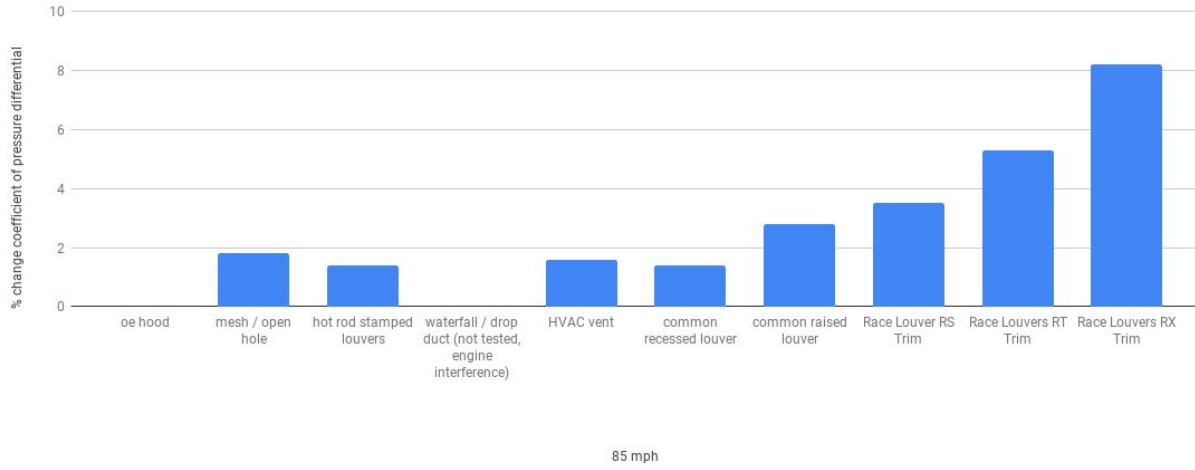
Figure 5 & 6

Similar to drag the additional airflow created by Race Louvers in maximum cooling configuration takes a few extra HP to maintain speed, however in maximum downforce configuration there is a reduction in required HP.

**Wind Tunnel Radiator Differential Pressure Percent Increase (Cooling Air Flow Increase)**

BMW E36, Single 24"x14" Center Vent Comparison. OE Grill Opening.

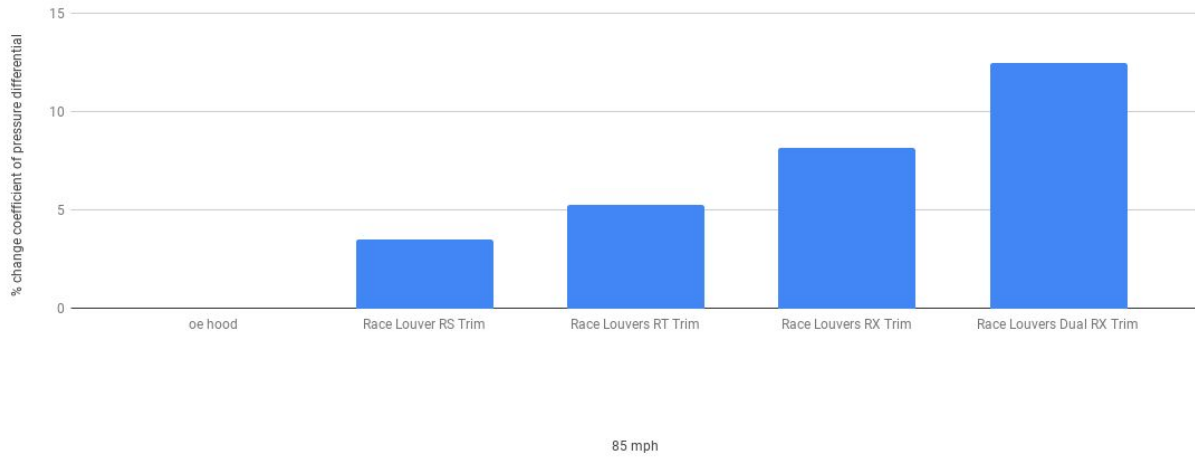
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**Wind Tunnel Radiator Differential Pressure Percent Increase (Cooling Air Flow Increase)**

BMW E36, Single Center Extractors vs Dual Extractors. OE Grill Opening.

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**Figure 4**

This is the percent change in coefficient of pressure differential between the front of the radiator and the rear of the radiator. Increased pressure differential equates to increased airflow thru the radiator and engine compartment and results in improved cooling. Race Louvers have up to 585% more airflow in maximum cooling configuration. This large increase in cooling ability directly determines how much the grill can be restricted for increased front downforce. If cooling is an issue simply installing some Race Louvers will significantly drop temperatures. If cooling is under control, adding some Race Louvers will over cool the car allowing the user to add grill restriction significantly increasing front downforce

Summing up, wind tunnel test results confirm our development data as well as our Audi A4 wind tunnel testing. As expected radiator flow is greatly increased which provides increased cooling in the radiator and engine compartment. Front downforce is improved as expected and we had the opportunity to test our RS, RT and TX Trims with grill restriction yielding significantly more front downforce. Traditionally vehicles rely on air being pushed thru the radiator, now with our louvers air is being pushed thru and pulled out creating much more airflow allowing for significantly reduced grill openings which reduce drag and greatly increase front downforce. With a OE grill opening our louvers did create some drag, it should be noted that it is not like drag in a wing which uses some energy to produce one gain, downforce, drag in our louvers produce four gains, downforce, radiator cooling, engine compartment cooling and zero speed cooling.

Customers can set up Race Louvers for maximum cooling or maximum front downforce or anywhere in between. Race louvers are design to increase airflow thru the radiator by providing suction behind the radiator, this rear suction combined with the front pressure can more than double the airflow thru the radiator, in the case of our E36 five times the airflow. This would provide a maximum cooling setup. Combining the rear suction of a Race Louver with a grill opening as small as possible to still sufficiently cool will provide huge gains in front downforce. This would be a maximum front downforce setup. Grill blockers or nose tape are easy ways to establish a setup right for your car and can easily be changed as needed. We recommend blockers/tape on the sides of the grill opening vs top or bottom as this performs the best.