

# */// Race Louvers*

Professional R&D - Wind Tunnel Tested - Track Proven

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Wicker / Gurney Flap / Raised Louver Wind Tunnel Data

Welcome to Race Louvers. Here we did some wind tunnel testing on the effects of an angled gurney flap and vertical wicker on a recessed louver vent design and compared them to typical time attack style raised louvers as well as our three Race Louver performance trims.

Test car: BMW E36, OE style radiator, small oil cooler, rad ducted to front grill, slimline fan with no shroud, back of rad open to engine bay with no exit ducting, oe engine and engine bay.

Test vents:

- blank panels to cover and seal the hood holes for a no vent baseline
- recessed louver vent
- recessed louver vent with a 3/4" angled gurney flap
- recessed louver vent with a 3/4" vertical wicker
- raised louver vent 1" overall height
- race louver RS street trim 3/8" overall height
- race louver RT track trim 3/4" overall height
- race louver RX extreme trim 1 1/2" overall height

Test procedure: Initial run no vents with hood sealed for a baseline, then simply swap out vents with no other changes for true back to back testing.

Data: All data is at 85mph wind speed. For higher wind speed data see our other wind tunnel reports.

Conclusion: As seen in previous wind tunnel testing most hood vent designs dont work very well. Adding a 3/4" tall leading edge to a common recessed louver vent design helps but not significantly. Both the angled gurney flap and vertical wicker performed similar with the vertical wicker edging out the angled gurney a tic. Common 1" raised louvers work better than recessed louvers but a tic less when a 3/4" wicker is added. Our Race Louver RS street trim performs far better than a common recessed louver design, Our 3/8" RS street trim matches the performance of the recessed louver design with a 3/4" wicker and Our 3/4" RT track trim at the same overall height nearly doubles the performance not to mention our 1 1/2" extreme trim besting them all. So while using a raised louver design or adding a gurney flap to a recessed louver design helps somewhat, its not the best design. Our extractors work significantly better as they are designed to maximize the use of the gurney as efficiently as possible.

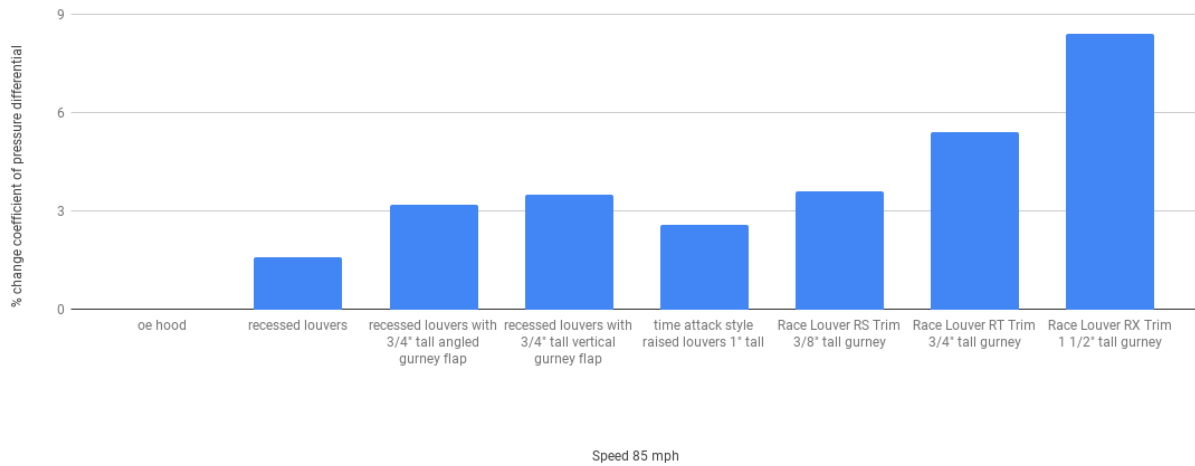
Extrapolations: So we know some will ask why we didnt test a taller gurney flap. The answer is two fold, one we wanted something the same size as our middle extractor trim so we can have a good comparison and two wind tunnel time is expensive so we cant test everything. However comparing our three designs where each is twice the height with similar increments in performance we can extrapolate the same with the gurney flap doubling its height and noting the incremental performance gains. One thing we immediately saw was drag dramatically increased with little gains in performance.

Recommendations: Obviously we recommend using our products right from the start. Even if you already have another vent, since ours function significantly better, upgrading to ours is well worth it. Last if you plan to add a gurney flap to your existing recessed louvers try and keep it under 1" tall as anything taller will have more drag with little gains.

**Wind Tunnel Radiator Differential Pressure Percent Increase (Cooling Air Flow Increase) - Gurney Flap & Raised Louver Testing**

BMW E36, Single 24"x14" Center Vent/Extractor Comparison. Maximum Cooling Configuration.

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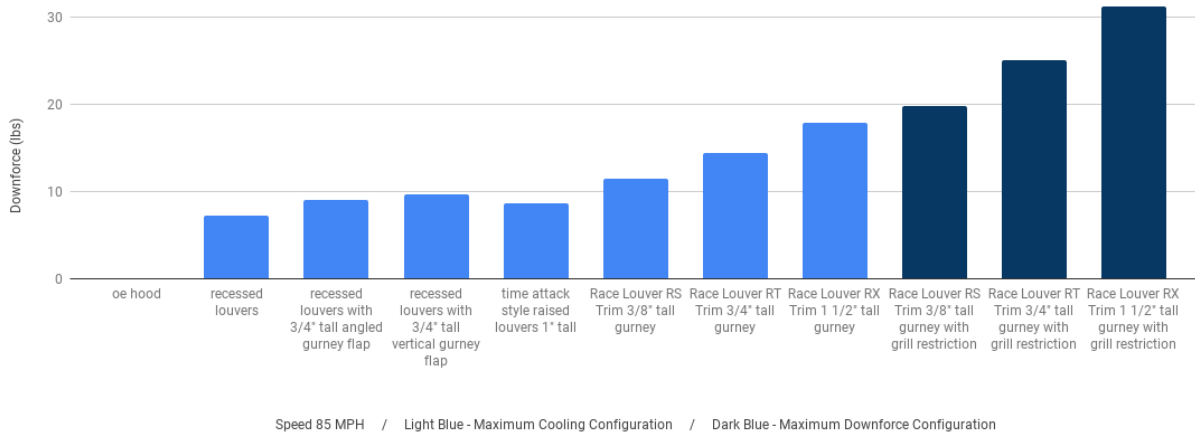


Here the addition of a gurney flap on a recessed louver vent design does improve cooling but Our RT design with the same height still has nearly twice the cooling. So while a gurney helps it is only part of the equation.

**Wind Tunnel Front Downforce - Gurney Flap & Raised Louver Testing**

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

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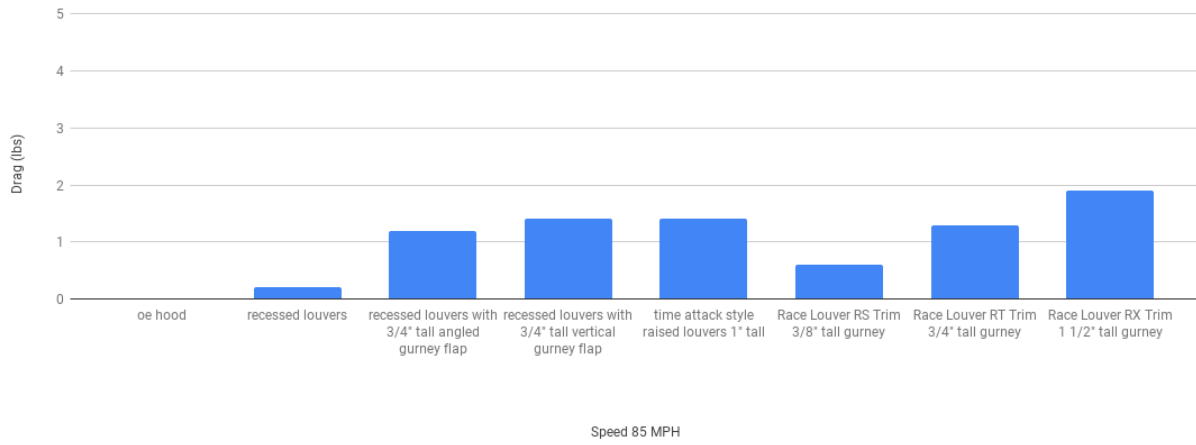


As seen here the addition of a gurney flap on a recessed louver vent design helps downforce slightly but not as much as you would think. Our RT design with the same overall height performs significantly better. So while a gurney flap helps its still just a small piece of an overall design.

**Wind Tunnel Drag - Gurney Flap & Raised Louver Testing**

BMW E36, Single 24"x14" Center Vent/Extractor Comparison. Maximum Cooling Configuration.

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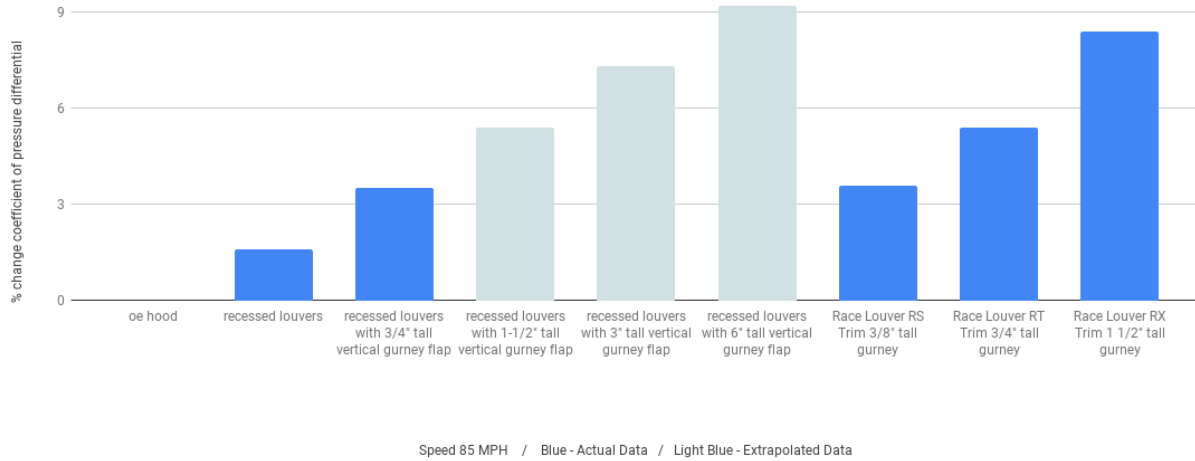
Here we see an increase in drag when a gurney flap is added to a recessed louver vent design, however Our RS design at half the overall height still has a more downforce but at half the drag.



**Wind Tunnel Radiator Differential Pressure Percent Increase (Cooling Air Flow Increase) - Gurney Flap & Raised Louver Testing**

BMW E36, Single 24"x14" Center Vent/Extractor Comparison. Maximum Cooling Configuration.

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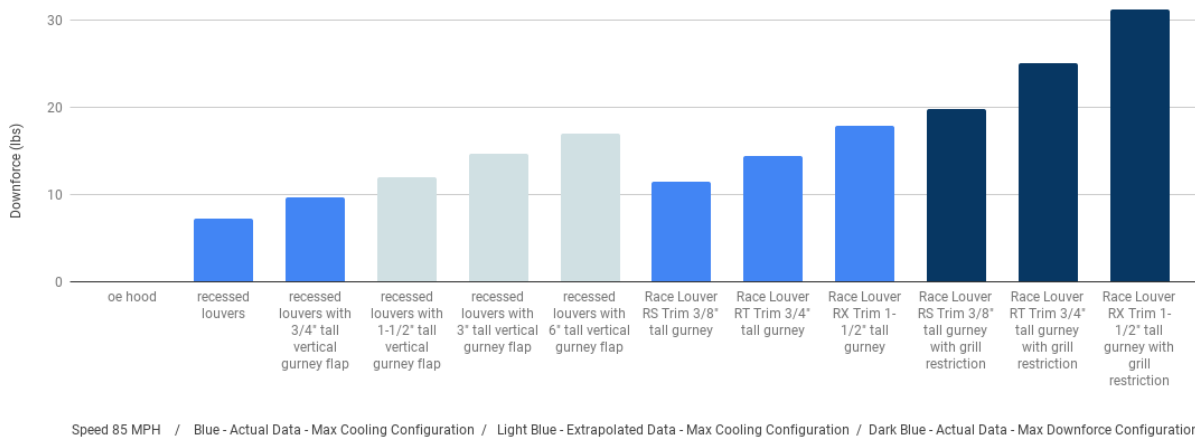


Here we extrapolate the cooling (light blue) to see what a taller gurney flap might do. Radiator differential pressure does increase but it takes about a 5" tall gurney to match our 1-1/2" RX extreme trim plus there is a drag penalty from taller gurneys seen in the chart below.

**Wind Tunnel Front Downforce - Gurney Flap & Raised Louver Testing**

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

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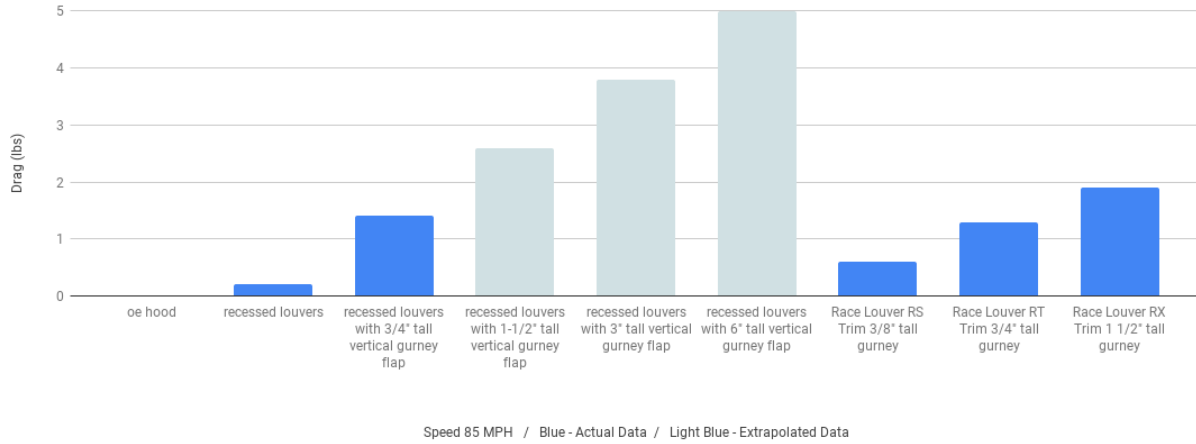


Here we extrapolated the downforce (light blue) to see what a taller gurney flap might do. Downforce does improve with taller gurney flaps but it takes a 6" tall gurney to match our 1 1/2" tall RX extreme trim. More importantly see the drag chart below.

**Wind Tunnel Drag - Gurney Flap & Raised Louver Testing**

BMW E36, Single 24"x14" Center Vent/Extractor Comparison. Maximum Cooling Configuration.

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Here we extrapolate the drag (light blue) from adding a taller gurney flap. Note the large increase in drag the taller the gurney flap is. Since we know aero forces quadruple with a double in speed, 5 lbs may not seem like alot at 85 mph but at 170mph the drag could become upwards of 20lbs.



Base line, No vents, hood sealed



Common Recessed Louvers



Recessed louvers with angled gurney flap 3/4" overall height



Recessed louvers with vertical wicker 3/4" overall height



Raised louvers, 1" overall height





Race Louver RS street trim, 3/8" overall height



Race Louvers RT track trim, 3/4" overall height



Race Louvers RX extreme trim, 1 1/2" overall height