/// Race Louvers

Professional R&D - Wind Tunnel Tested - Track Proven

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Hood Shootout

Race Louvers Vs Extractor Hood Vs Radiator Exit Ducting

Wind Tunnel Data

Welcome to Race Louvers. In previous wind tunnel testing we've compared various hood vent designs on the market along with our Race Louver designs. Here we had the oppurtunity to compare our Race Louvers on a stock hood to a high end CF heat extractor hood and also to a hood where there was full exit ducting from the radiator to the hood opening. Thanks to AJ Hartman Aero for the use of their mustang. The car already had a fair amount of aero and had full radiator exit ducting so all we needed was a stock hood with some Race Louvers and a good heat extractor hood to see how things stacked up. For the stock hood we acquired one on craigslist and installed a Race Louvers center pair. The heat extractor hood was a bit of a challenge, first we had to put a list together of various hood designs, compare those designs to vent designs previously tested in the wind tunnel, come up with a top three list and then from that list we had to locate a '99-04 mustang with one of those extractor hoods and willing to loan it to us. Thanks to Mark Aubele we got lucky and found a nice high end CF extractor hood to test.

Test car prep level for fender testing:

- 2000 Mustang GT
- Ecoboost V6 swap
- Splitter with tunnels, air dam, front rad ducted to grill, upper and lower front fender vents sealed, no flat floor, no rear diffuser, dual element wing

Hoods tested:

- OEM stock hood, no vents, no rad exit duct, back of rad open to engine bay (baseline)
- Race Louvers extractor pair on a stock hood, no rad exit duct, back of rad open to engine bay
- CF heat extractor hood, no rad exit duct, back of rad open to engine bay
- Full rad exit ducting, back of radiator connected to hood via ducting

Test procedure:

- Simply swap out hoods with no other changes for back to back testing

Conclusions:

- Race Louver extractors netted the best cooling by far, best downforce but some drag increase
- CF extractor hood had a slight gain in cooling, ok downforce, no drag change
- Full rad exit ducting had significantly less cooling, good downforce and some drag reduction
- Not all hood vents, extractor hoods or exit ducting are created equal
- The addition or reduction of drag is directly related to the addition or reduction in cooling airflow
- If you need cooling the slight drag increase from more airflow certainly outweighs overheating
- If cooling is under control but more front downforce is desired adding hood extraction and reducing the front grill opening maintains the cooling but nets a significant increase in downforce
- Having the back side of the radiator open to the engine bay allows the airs low pressure to act on the underside of the hood and bodywork creating more downforce while isolating the airs low pressure at the back side of the radiator via full exit ducting does not
- Another thing to consider is full radiator exit ducting isolates the engine bay from any kind of cooling airflow thru it for engine components, headers, turbos, floor boards etc
- Adding good hood and fender extraction allows radiator air to exit out of the bottom, top and sides of the car vs just the bottom netting significant cooling and front downforce. This generally outperforms full exit ducting on most vehicles and is easier packaging wise. However, more complex aero such as flat bottom cars with rear diffusers take away the exit airflow path out the bottom of the car which reduces cooling, but reduces drag and adds significant downforce so the choice between louvers or exit ducting isn't as cut and dry with complex aero packages

Race Louvers Wind Tunnel Video: https://www.youtube.com/watch?v=Pq2jLvwC9_8
AJ Hartman Aero Wind Tunnel Video: https://www.youtube.com/watch?v=1B2LdsQdO1U&t=51s

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Part 1
Raw Back to Back Hood Data

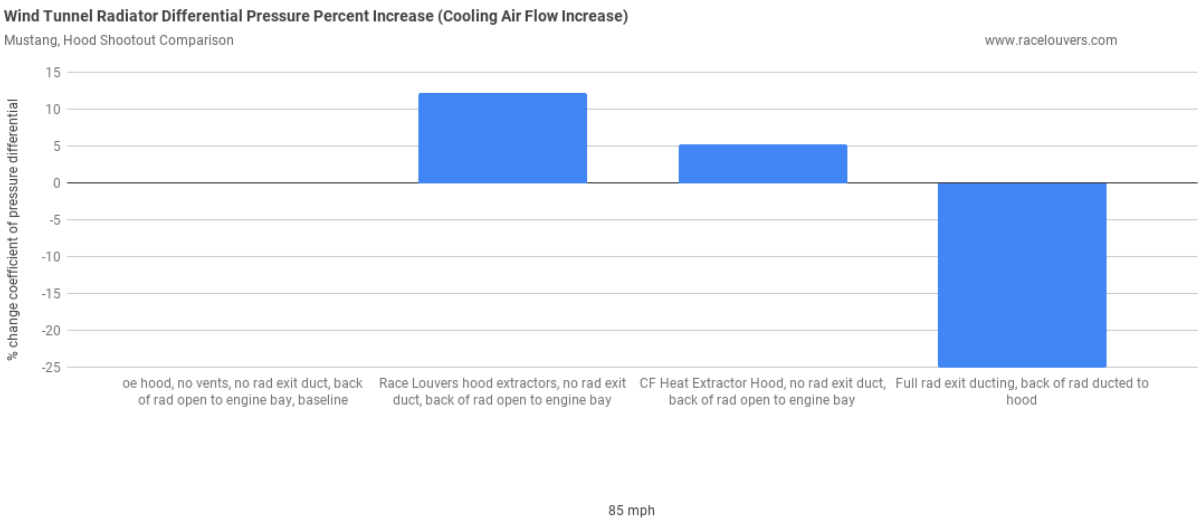

Fig 1. Radiator differential pressures - cooling airflow

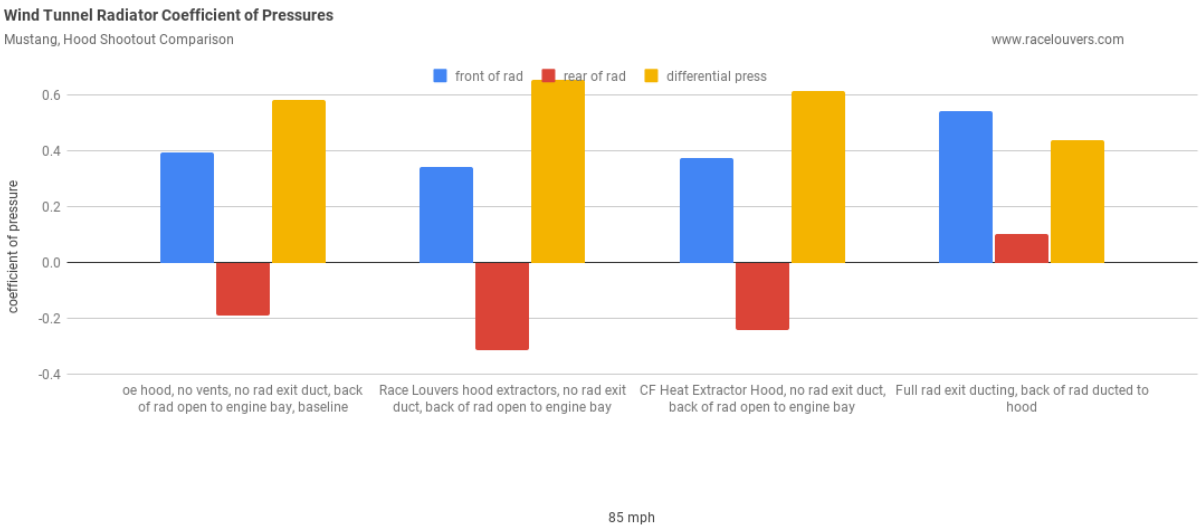

Fig 2. Radiator pressures in detail, front, rear and differential - cooling airflow

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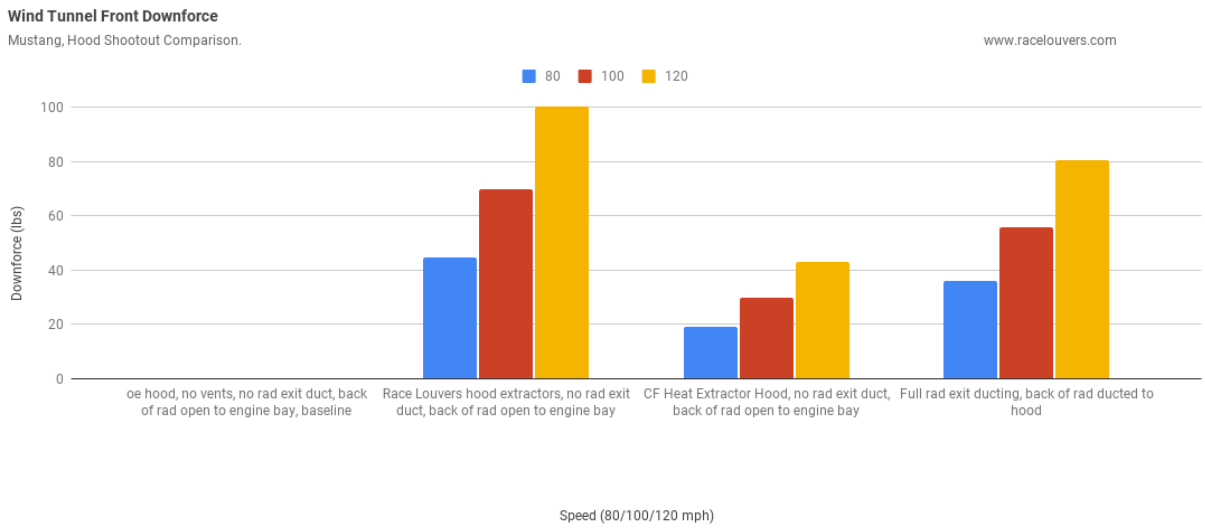

Fig 3. Front downforce

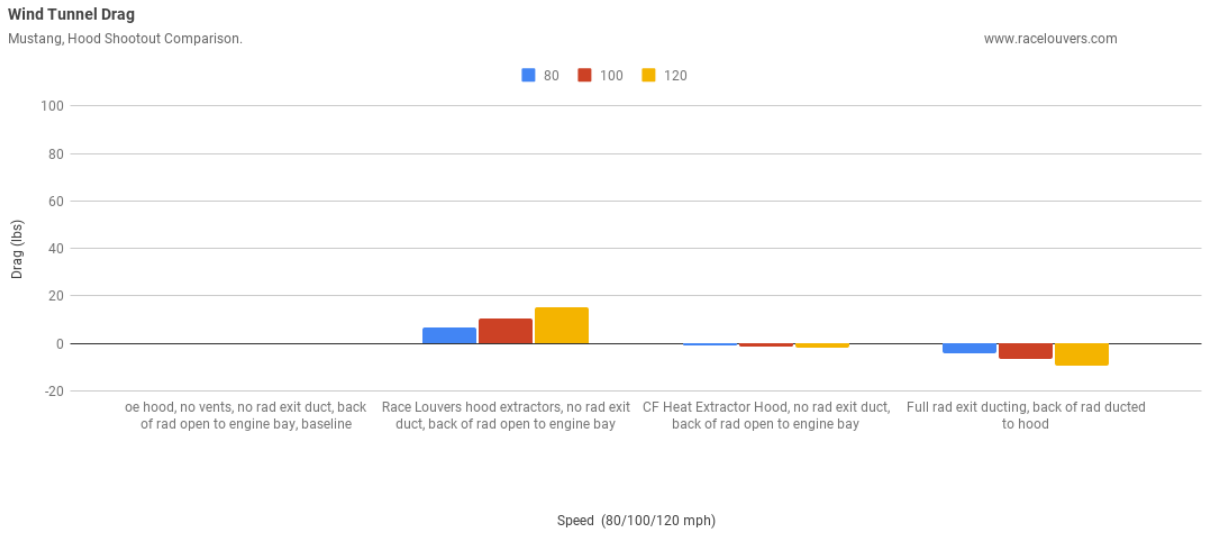

Fig 4. Change in overall vehicle drag

Part 1 Initial Conclusions:

- Race Louvers has significantly better cooling, more downforce at the cost of some drag
- The CF extractor hood had some cooling, lowest downforce but no drag
- The full radiator exit ducting had the least cooling, good downforce with a drag reduction

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Part 2
Extrapolation & Details

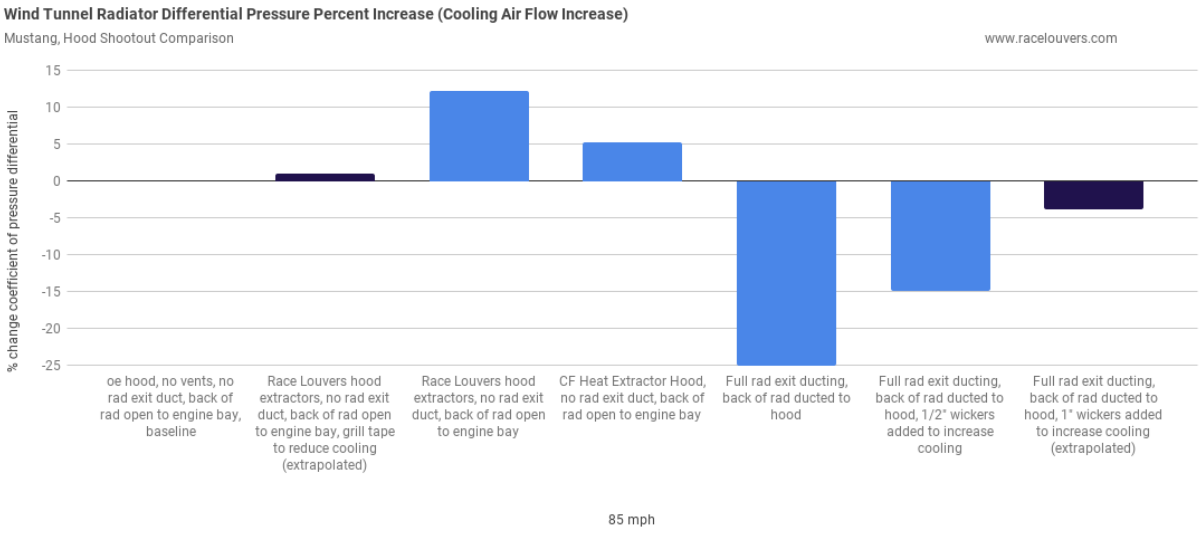

Fig 5. Adding wickers to the radiator exit ducting to improve cooling and adding grill restriction to the Race Louvers to reduce cooling to see how drag and downforce compares with similar cooling airflow

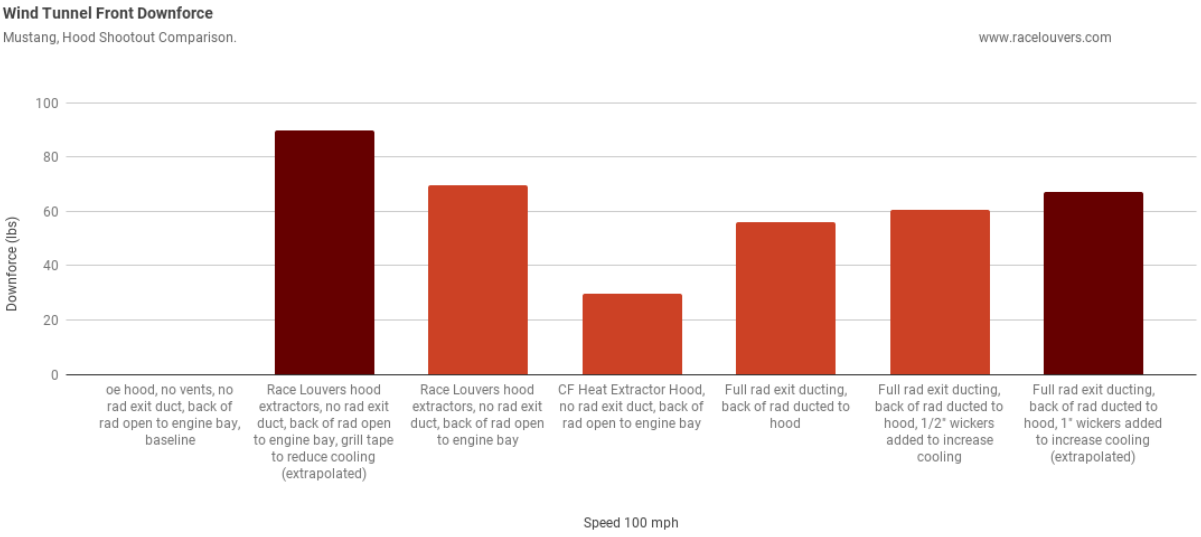

Fig 6. Wickers on the full exit ducting and grill restriction on the Race Louvers nets similar cooling and drag however downforce on the Race Louvers is much more than the exit ducting

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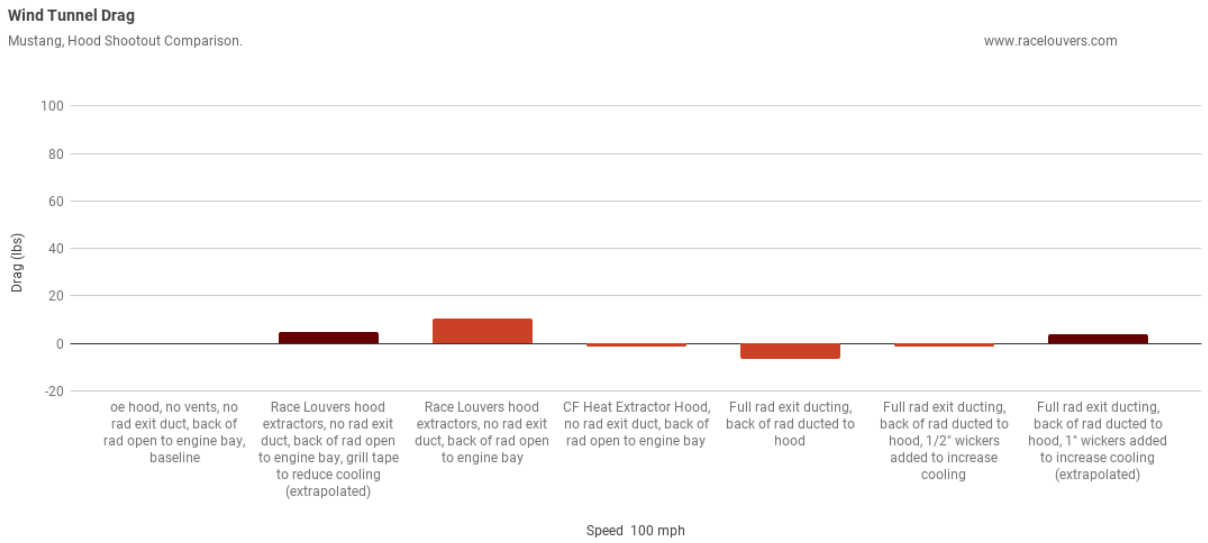

Fig 7. Wickers on the full exit ducting and grill restriction on the Race Louvers nets similar cooling and similar overall drag

Part 2 Conclusions:

- Adding wickers to improve cooling on the radiator full exit ducting helps but increases drag
- Adding grill restriction to Race Louvers reduces cooling, but reduces drag and adds downforce
- Drag is directly related to cooling airflow, increasing cooling increases drag, decreasing cooling decreases drag
- Having the back side of the radiator open to the engine bay allows for more downforce while having it isolated via full exit ducting does not
- It should be noted the above mustang is regularly raced with 1/2” wickers on the exit ducts and cooling is ok, so if we compare cooling rad diff press on the race louvers vs the 1/2” exit wickers instead of the stock hood without vents the race louvers have a significant cooling advantage
- If you need more cooling, Race Louvers is the ticket
- If you need more front downforce, Race Louvers and grill restriction is the ticket
- Race Louvers nets the best cooling, best downforce with little drag

Caveats:

- Vehicles with complex aero such as flat floors and diffusers typically block the radiator exit air out the bottom of the car and create downforce and cooling differently than most cars. The performance difference between Race Louvers or full radiator exit ducting on these types of cars are too close to call. Until we can run this test in the wind tunnel with a flat floor and diffuser we consider both setups to be similar with regards to cooling, downforce and drag.

Final Conclusions:

- Race Louvers again prove to have serious functionality, are inexpensive and easy to install
- Most extractor hoods on the market dont work as well as you would think and can be expensive
- Exit ducting likely hurts performance and may not be worth the trouble on most cars

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Baseline - Stock OEM Hood
(no vents, no radiator exit ducting, back of rad open to engine bay)

Race Louvers Hood Extractors
(no radiator exit ducting, back of rad open to engine bay)

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Carbon Fiber Extractor Hood
(no radiator exit ducting, back of rad open to engine bay)

Radiator Full Exit Ducting
(back of rad connected to hood openings via ducting)

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No rad exit ducting for OEM hood, Race Louvers and CF extractor hood tests
(back of radiator open to engine bay)

Rad Exit Ducting
(back of radiator connected to hood openings via ducting)

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TOP 3
Extractor hoods we felt worked good and wanted to test

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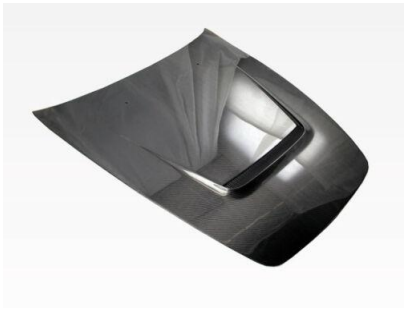
Other extractor hoods that didn’t make the cut



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