



ENGINEERING REPORT

2017+ Ford F-150 2.7L & 3.5L EcoBoost Intake | SKU: MMAI-F35T-17

By Ye Liu, *Mishimoto Engineer*

REPORT AT A GLANCE

- **Goal:** Create a direct-fit, high-quality intake for the 2017+ Ford F-150 2.7L & 3.5L EcoBoost.
- **Results:** The Mishimoto performance intake demonstrated gains of 14 hp and 17 lb-ft over the stock intake and is 46.4% less restrictive when tested on the flow bench.
- **Conclusion:** The Mishimoto performance intake is an ideal bolt-on upgrade for the 2017+ Ford F-150 2.7L & 3.5L EcoBoost owners looking for performance gains and intake sound improvement.

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DESIGN OBJECTIVES

The design requirements assigned to this project are as follows:

- Improve airflow while maintaining a safe air/fuel ratio without custom tuning
- Durable design that will last the lifetime of the vehicle
- Easy bolt-on installation without any permanent modification to the vehicle
- High-quality intake tone
- Compatible with Mishimoto off-road snorkel kit (Raptor model only)
- Compatible with Mishimoto inlet pipe kit

MATERIAL SELECTION

The material used for the rotational-molded airbox and intake tube is XLPE (Cross-Linked Polyethylene) plastic. XLPE demonstrates high-impact strength, excellent heat resistance, and is UV-stable. The flexible grommet that connects the intake tube to the airbox is made of injection-molded silicone rubber that can withstand engine bay heat up to 350°F. The silicone intake tube coupler has an additional layer of FVMQ (Fluorosilicone) inside that demonstrates excellent fuel and oil resistance.

DESIGN AND FITMENT

Our design process started with taking the stock intake apart, thoroughly investigating the system, and searching for possible improvements to be made. The stock intake system utilizes a removable duct to feed fresh air from the top of the radiator cover to the bottom of the airbox, which is the most common design employed by Ford trucks. Aftermarket intakes can sometimes take advantage of an under-sized stock air duct by replacing it with a new design of significantly larger cross-sectional area, which is the method we employed on the 2019+ Ford Ranger intake design. However, this is not the case with the F-150. The cross-sectional area of airflow entry on the stock duct is already at the limit of what the hood and radiator cover geometry would allow. There is no significant reduction of this flow area on the exiting side at the airbox either. These findings tell us that the stock air duct is not a restriction point, and we have to find flow gains elsewhere. This is accomplished by adding a secondary fresh air source at the back of the Mishimoto airbox, which draws cold air from the fender area. The dual-inlet strategy, combined with an over-sized high-flow conical air filter and larger inlet tube, yielded an average of 46.4% less restriction compared to the stock intake when tested on the flow bench.

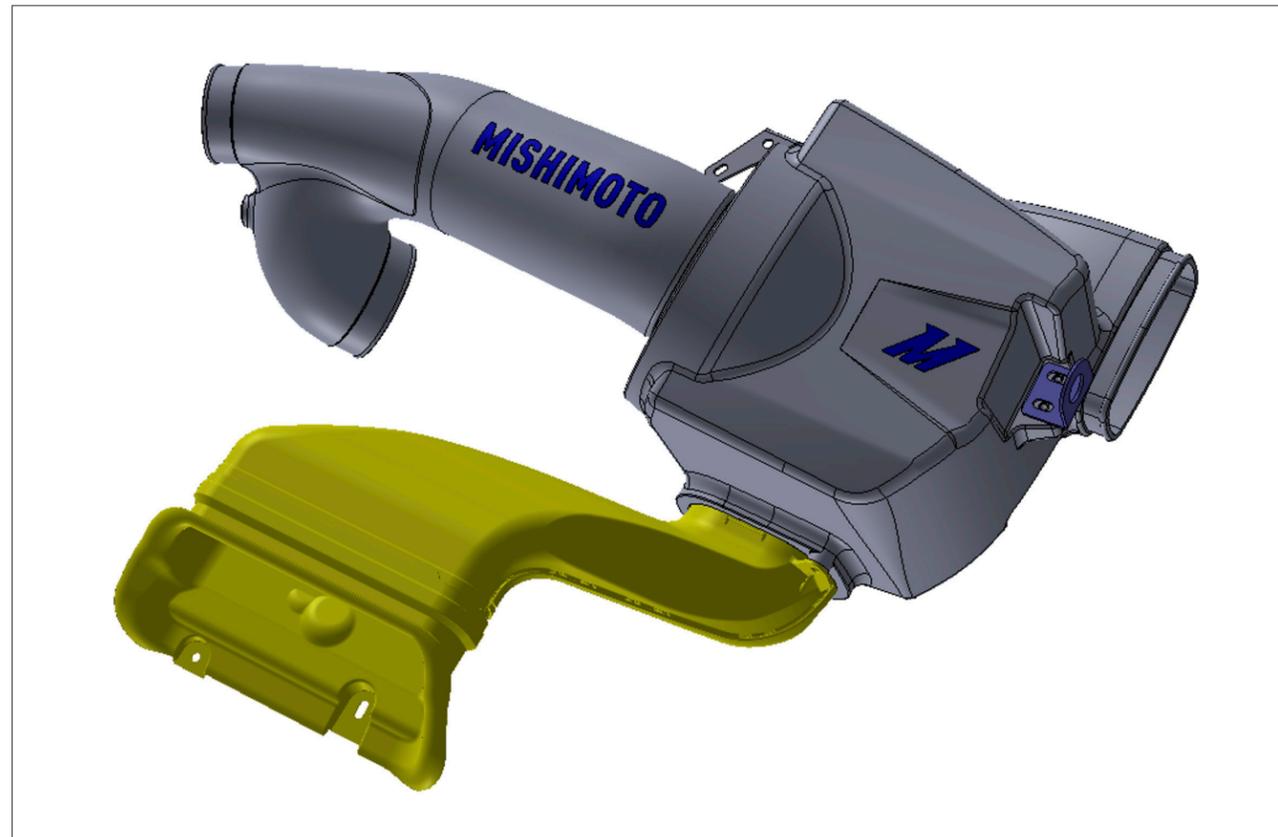


FIGURE 1: Mishimoto intake design retains the stock fresh air duct and improves airflow by adding a second inlet port that draws cold air from the fender area.



FIGURE 2: Mishimoto intake production sample installed on a Raptor model.

SOUND TESTING

The Mishimoto performance intake produces a louder and deeper intake tone that is pleasing to the ear and increases the turbo spool sound. Find our intake sound recordings on the Mishimoto Engineering Blog:

[Visit Mishimoto Engineering Blog](#)

PERFORMANCE TESTING

The Mishimoto intake prototype was tested on a Raptor model with our Dynojet dynamometer. Testing day temperature was 80°F and the humidity was 22%. The results shown below are average data curves of at least six consecutive dyno runs. The Mishimoto intake showed peak gains of 8 hp and 4 ft-lbs and max gains of 14 hp and 17 ft-lbs.

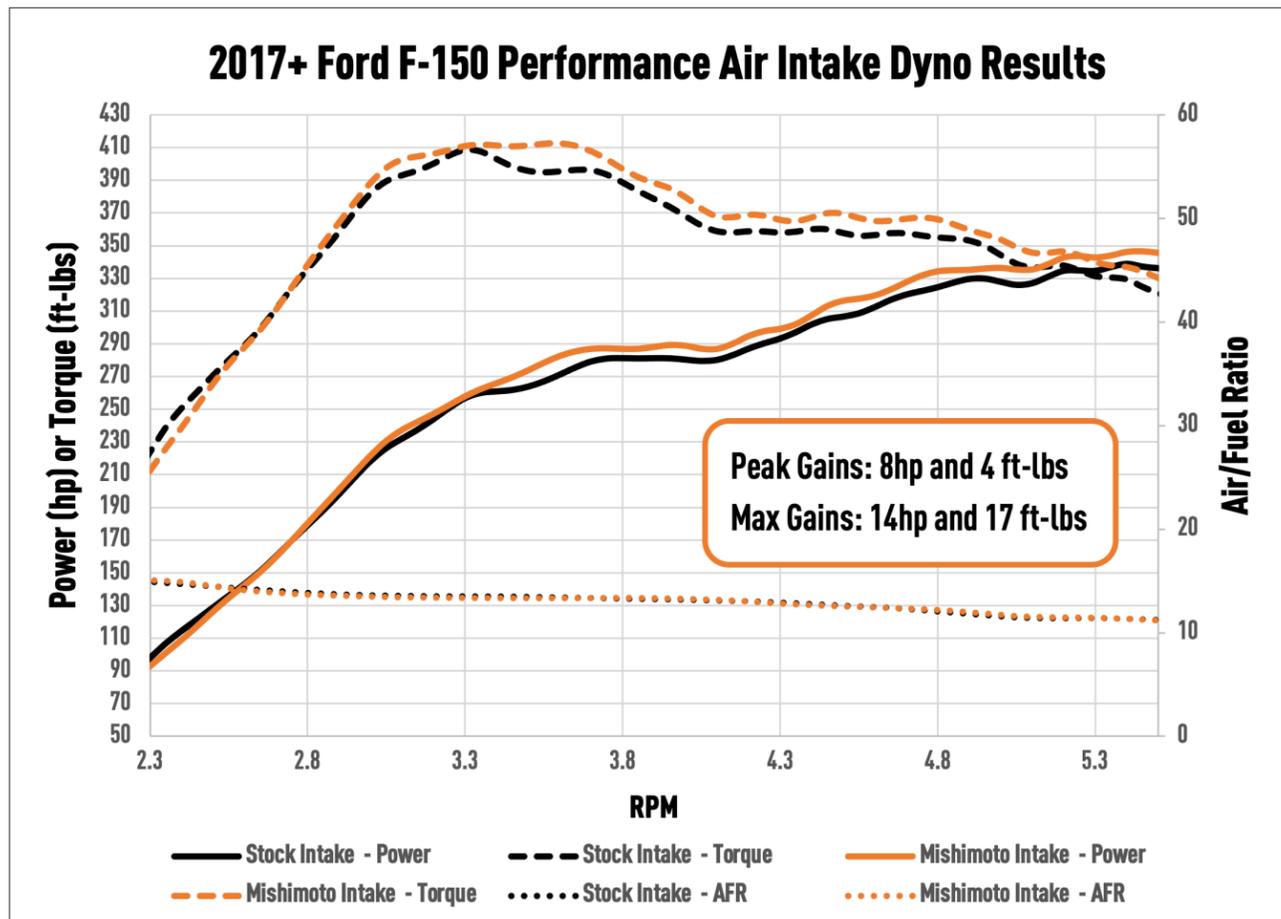


FIGURE 3: Mishimoto vs. Stock intake dyno results.

2017+ Ford F-150 Performance Air Intake Flow Bench Results

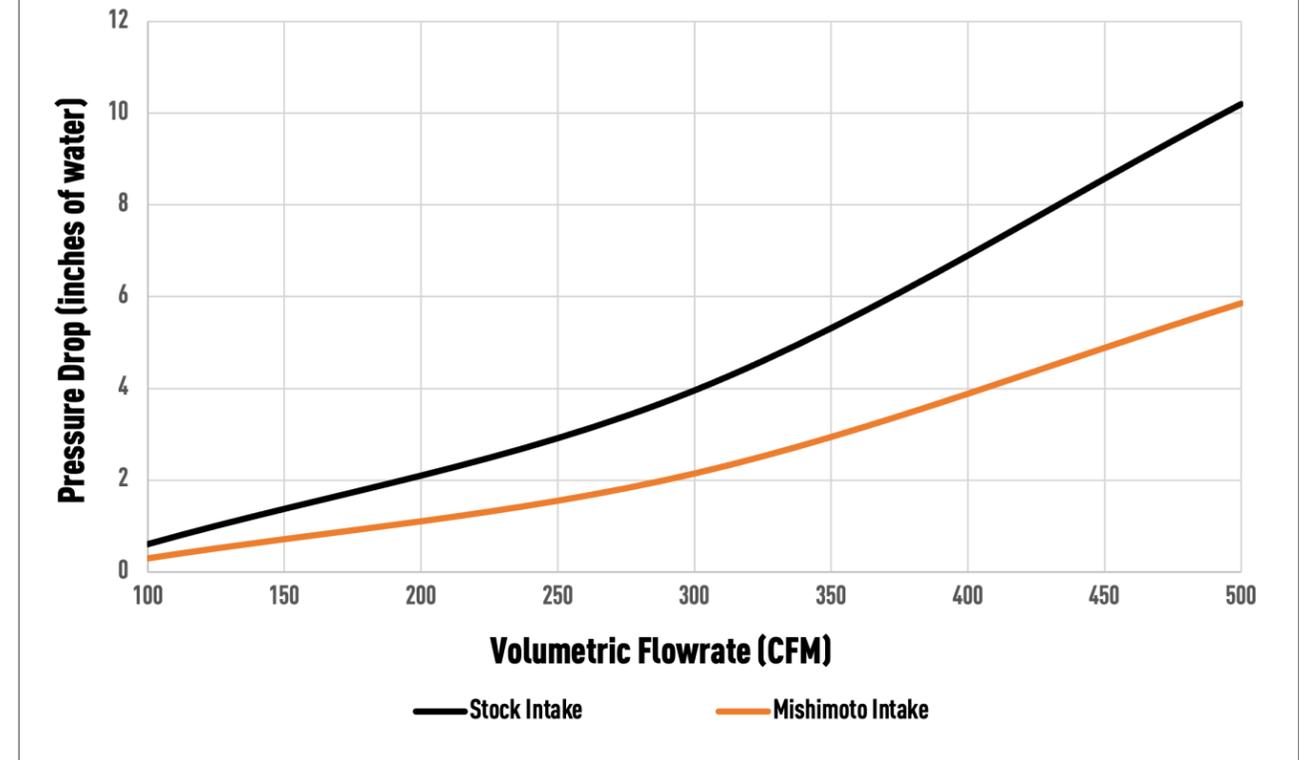


FIGURE 5: Mishimoto vs. Stock intake flow bench results.

INSTALLATION NOTES

The Mishimoto performance air intake for the 2017+ Ford F-150 2.7L & 3.5L EcoBoost is a direct-fit upgrade. No permanent modification or custom tune is required. This intake is also compatible with the Mishimoto snorkel kit (Raptor model only) and the Mishimoto inlet pipe kit.

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