



ENGINEERING REPORT

2016–2018 Ford Focus RS Performance Air Intake | SKU: MMAI-RS-16

By Ye Liu, *Mishimoto Engineer*

REPORT AT A GLANCE

- **Goal:** To create a high-quality performance intake for the 2016–2018 Focus RS.
- **Results:** Consistent performance gains across a higher RPM range. Improved intake sound compared to the stock system. High-flow conical air filter with integrated velocity stack provides increased and improved airflow to the engine. Enclosed airbox blocks radiating engine bay heat while maintaining cold, fresh air supply to the filter through an open-lid airflow design. Precision-designed intake pipe and silicone hose increases airflow rate by maximizing internal volume and minimizing restriction.
- **Conclusion:** Dyno testing showed consistent horsepower and torque gains across the testing RPM range, with max gains of 11.59 hp and 15.13 ft-lb over the stock intake system.

CONTENTS

PG 1	— DESIGN OBJECTIVES
	— DESIGN AND FITMENTS
PG 2	— SOUND TESTING
	— PERFORMANCE TESTING
	— INSTALLATION NOTES

DESIGN OBJECTIVES

The design requirements assigned to this project are as follows:

- Performance gain while maintaining safe air/fuel ratio without custom tuning
- Minimize restriction and maximize internal air volume within intake system
- Durable, sturdy construction that will last the lifetime of the vehicle
- Easy bolt-on installation without any permanent modification done to the vehicle
- High-quality intake tone
- Aesthetically pleasing addition to the engine bay

DESIGN AND FITMENTS

The stock intake system on the 2016–2018 Focus RS is very similar to the previous generation Focus ST. Fresh ram air comes in from above the radiator support, then is divided into two separate streams by a pair of snorkels. Unlike most OE intakes, Ford employs a conical paper filter rather than a panel filter on the Focus RS to maximum

surface area coming in contact with fresh air. One stream of fresh air is fed to front side of the conical filter and the other stream to the underside of the filter.

This air entry strategy helps to introduce more fresh and cold air into the intake system, rather than letting the filter soak in heated air that has been sitting in the box for a while. Our airbox is designed around these two inlet snorkels to utilize this concept. Inside the airbox sits Mishimoto’s high-flow conical filter with an integrated velocity stack feature. The 3-inch aluminum intake pipe opens up air restriction by maximizing internal volume and eliminating the unnecessary “bottle neck” geometry seen on the stock system. The intake pipe gets mounted to all original mounting points on top of the engine by two adjustable brackets. The pipe also provides mounting locations for the tree clip and grommet that secure the surrounding vacuum line, similar to the stock system. A steel wire-reinforced silicone coupler connecting the 3-inch aluminum piping to the 2.5-inch turbo inlet is designed to have a long and smooth geometric shape that offers a gradual transition for the different diameters, with built-in steps to keep the inner surface flush against different components, further minimizing restriction and air turbulence.



FIGURE 1: Initial production sample installed.

SOUND TESTING

Intake sound is one of the most important features of a performance intake. The Mishimoto performance intake lends a loud, throaty and aggressive intake tone that is pleasing to the ear. We recorded stock and Mishimoto intake sounds on the dyno, which can be found on our Engineering Blog:

MISHIMOTO ENGINEERING BLOG

PERFORMANCE TESTING

Performance testing was conducted on our in-house DynaPack dynamometer. All testing was done in 3rd gear on our engineering vehicle with 6-speed manual transmission, with the vehicle’s dyno mode turned on. The test results shown below in Figure 2 are an average of at least three dyno runs. We do not take the highest or lowest dyno runs to prove artificial power gains. The Mishimoto performance intake showed only a 0.2% difference from the stock intake on air/fuel ratio, as shown in Figure 3, and is considered well within safe range to run on a stock tune.

Flow bench testing further proved the Mishimoto performance intake open-lid version to be **32% less restrictive than the stock intake. The closed-lid version is 22% less restrictive than the stock intake. Results can be found in Figure 4.**

INSTALLATION NOTES

The Mishimoto air intake for the 2016–2018 Focus RS can be installed on a completely stock car without any modification to the vehicle, and no custom tuning is required.

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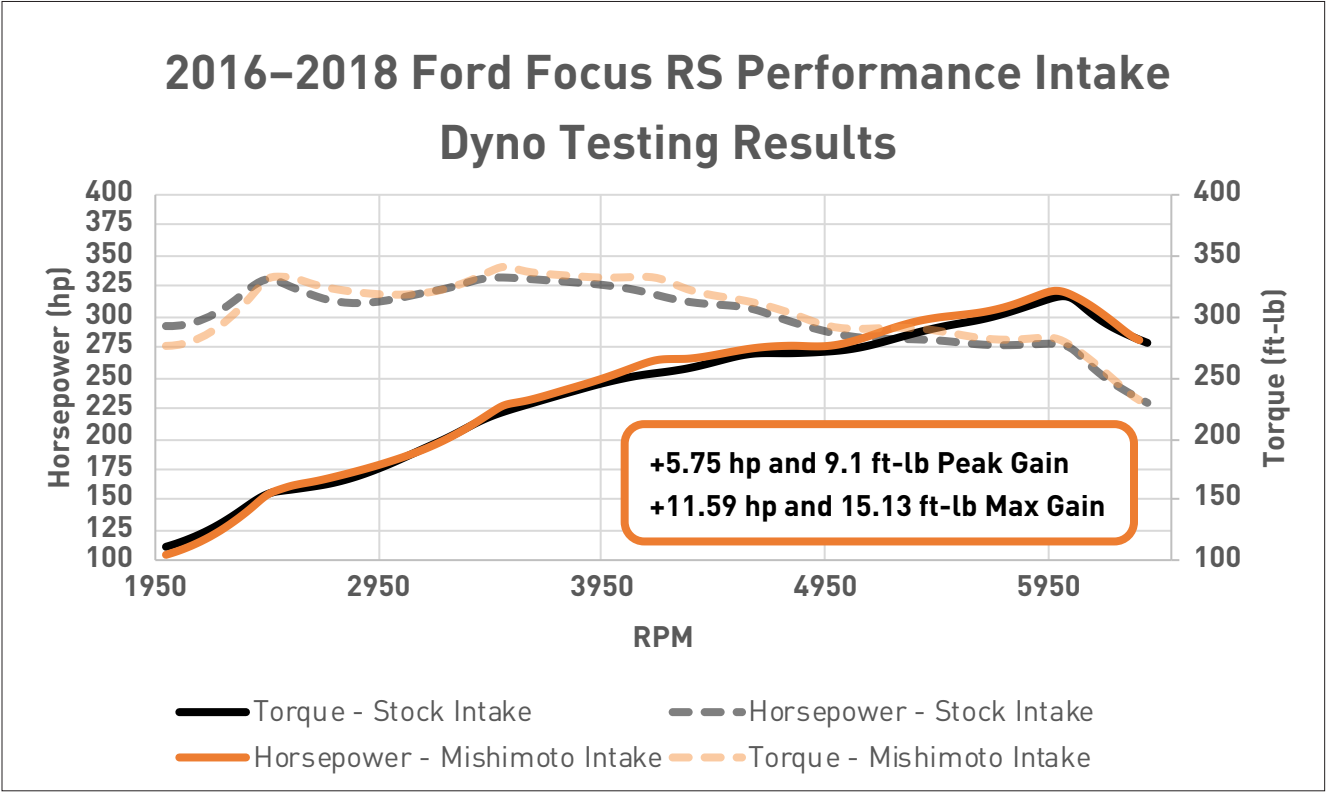


FIGURE 2: Dyno results (horsepower and torque).

2016–2018 Ford Focus RS Performance Intake Dyno Testing Results

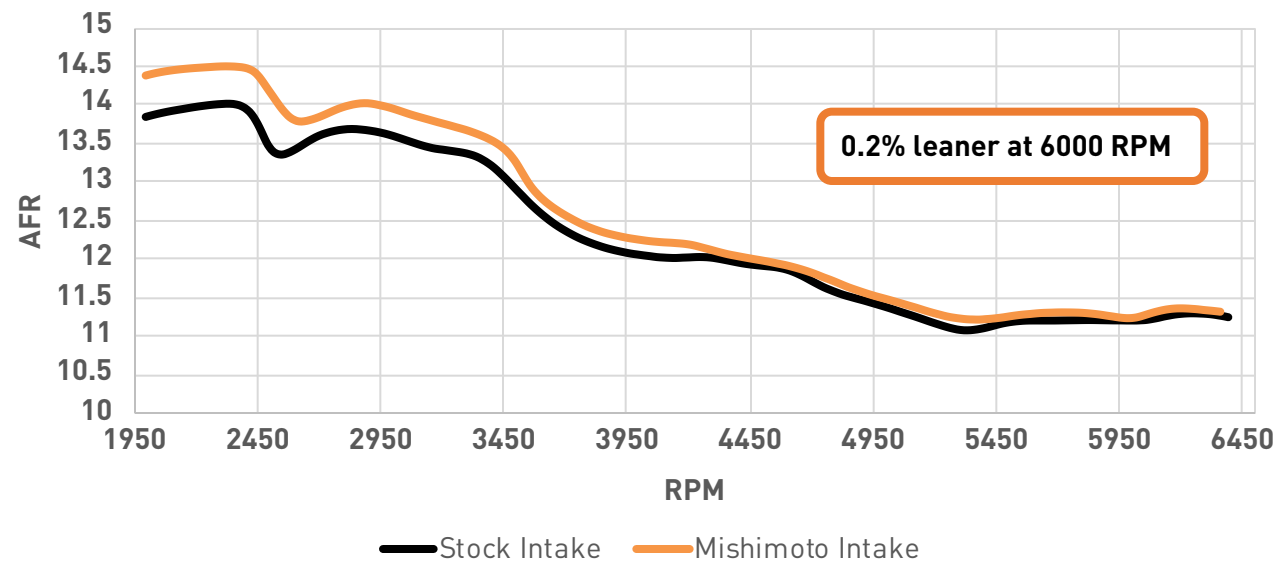


FIGURE 3: Dyno results (air/fuel ratio)

2016–2018 Ford Focus RS Performance Intake Flow Bench Testing Results

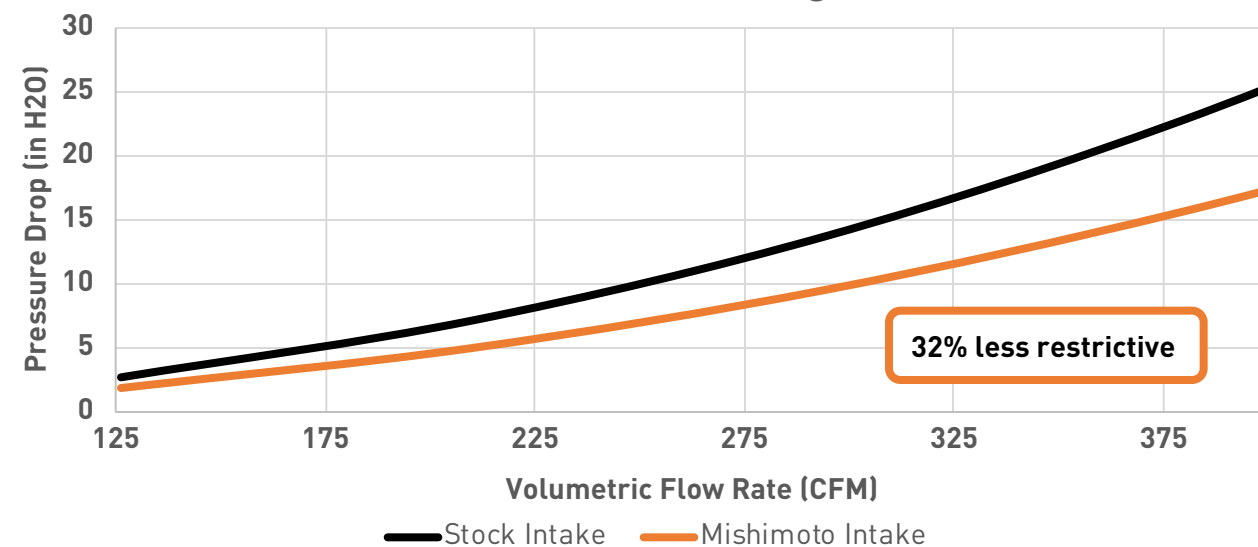


FIGURE 4: Flow Bench Testing Results

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