



MISHIMOTO



ENGINEERING REPORT

2019+ Ford Ranger 2.3L EcoBoost Performance Air Intake | SKU: MMAI-RGR-19

By Ye Liu, *Mishimoto Engineer*

REPORT AT A GLANCE

- **Goal:** Create a direct-fit, high-quality intake for the 2019 Ford Ranger 2.3L EcoBoost.
- **Results:** The Mishimoto performance intake showed consistent power and torque gains over the RPM range of 3000 to 6000, with max gains of 6.3 whp and 7.9 wtq. The Mishimoto intake design incorporates a fresh air scoop that replaces the stock air duct which yielded 49% less restriction on the flow bench compared to the stock intake.
- **Conclusion:** The Mishimoto performance intake is a great upgrade for the 2019 Ford Ranger 2.3L EcoBoost owner looking for performance gains and intake sound improvement, all while retaining compatibility with stock tuning.

CONTENTS

PG 1	— DESIGN OBJECTIVES
	— MATERIAL SELECTION
	— DESIGN AND FITMENT
PG 3	— PERFORMANCE TESTING
PG 5	— INSTALLATION NOTES

DESIGN OBJECTIVES

- The design requirements assigned to this project are as follows:
- Performance gain over the stock intake while maintaining safe air/fuel ratios without custom tuning.
 - Durable design that will last the lifetime of the vehicle.
 - Easy bolt-on installation without any permanent modification done to the vehicle.
 - High-quality intake tone.
 - Compatible with larger, aftermarket intercooler pipes.

MATERIAL SELECTION

The material used for the rotational-molded airbox and intake tube is XLPE (Cross-Linked Polyethylene) plastic. XLPE material demonstrates high-impact strength, excellent heat resistance and is UV-stable. The flexible grommet that connects the intake tube to the air box is injection-molded silicone that resists engine bay heat up to 350°F. The intake tube coupler is made of silicone with a layer of FVMQ lining 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 areas of improvement. The stock intake system consists of a short rubber hose and an enclosed airbox with a paper panel filter. Fresh air enters through a snorkel on top of the radiator cover to the lower half of the air box. With the help of our in-house flow bench, we identified that the stock air duct is a restriction point. We could improve airflow significantly by redesigning this part and incorporating it into the rotational-molded air box. This design increases the inlet cross-section area by 40%, eliminates two bends in the air path and shortens the path by 50%.

The corrugated stock intake hose is replaced by a rotational-molded tube with a much larger internal flow volume. A silicone grommet is employed to connect the intake tube and air filter assembly to the air box. This eliminates the need for an air box lid while providing ample flexibility in the intake system for engine movement.

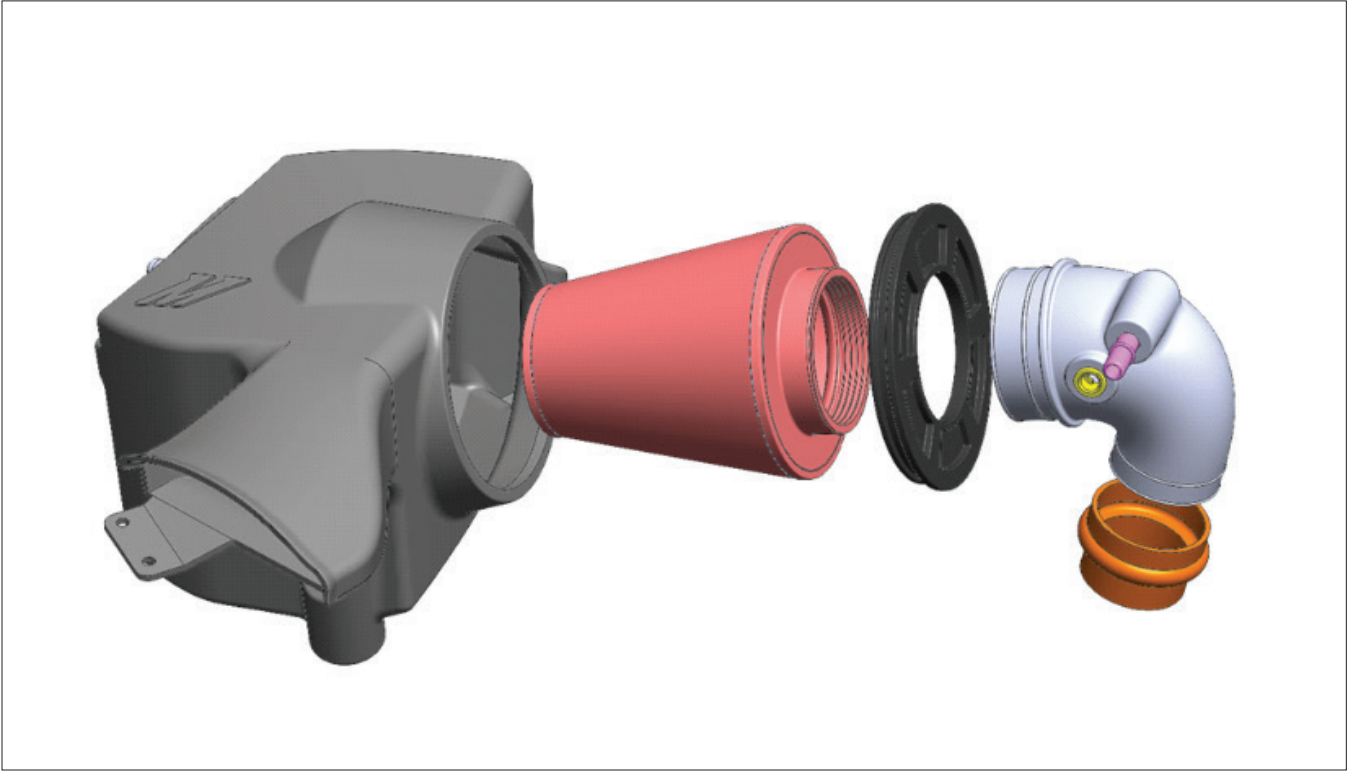


FIGURE 2: Mishimoto intake design.



FIGURE 1: Stock intake.



FIGURE 3: Mishimoto intake prototype installed for long term testing.



FIGURE 4: Mishimoto intake production sample.

PERFORMANCE TESTING

Performance testing was carried out on our in-house Dynojet dynamometer. The testing day temperature was 82°F and the humidity was 37%. All dyno runs were conducted in 4th gear.

We have tested the intake on both the stock tune and the SCT 93 octane tune. The Mishimoto intake created consistent power gains from 3000RPM to 6000RPM with almost identical air/fuel ratios compared to stock. The dyno results,

performance gains, and air/fuel ratios can be found in figure 4 and figure 5 below. Due to the nature of dyno testing, there will always be some variance between runs. The results shown are average data curves of at least 6 dyno runs, as we do not take the highest or lowest dyno runs to artificially inflate gains.

Flow bench testing (Figure 6) also showed that the Mishimoto intake with oiled filter is 49% less restrictive than the stock intake.

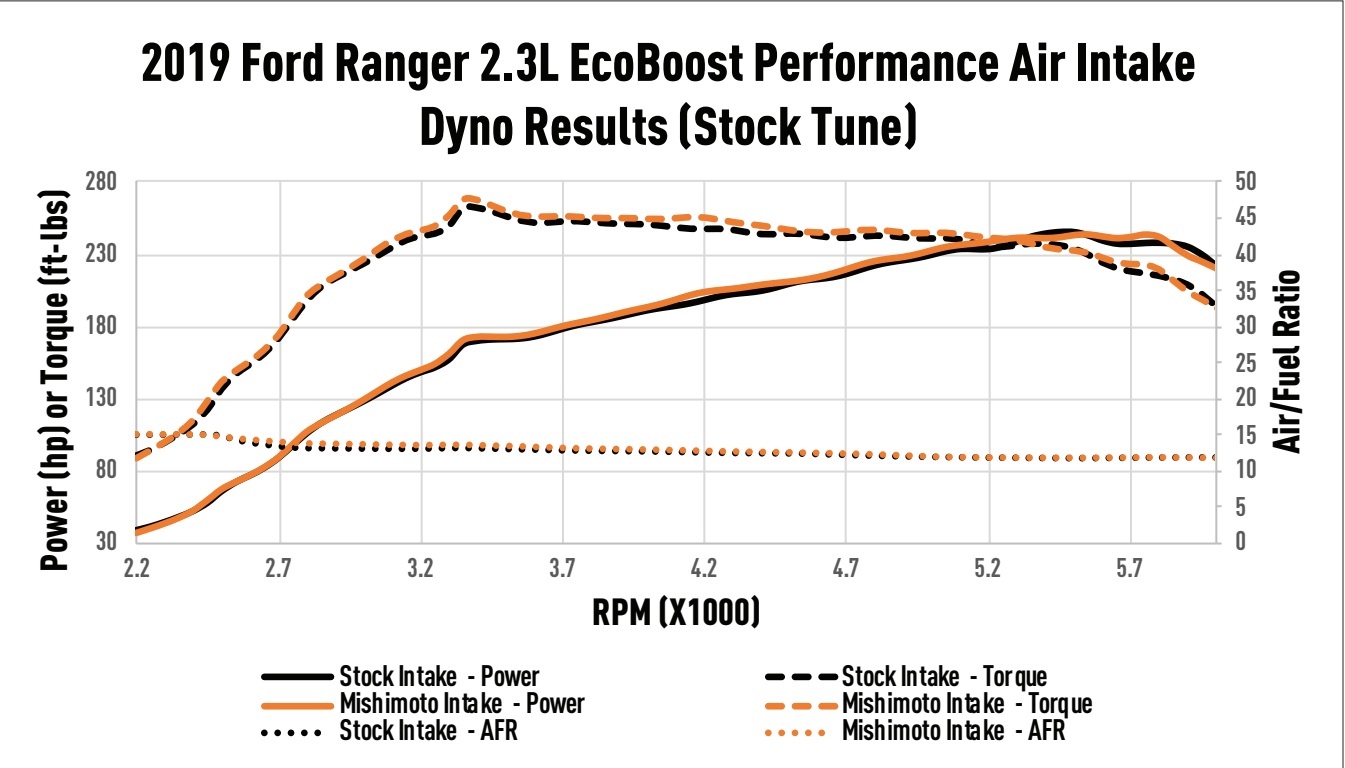


FIGURE 5: Dyno results (Stock tune).

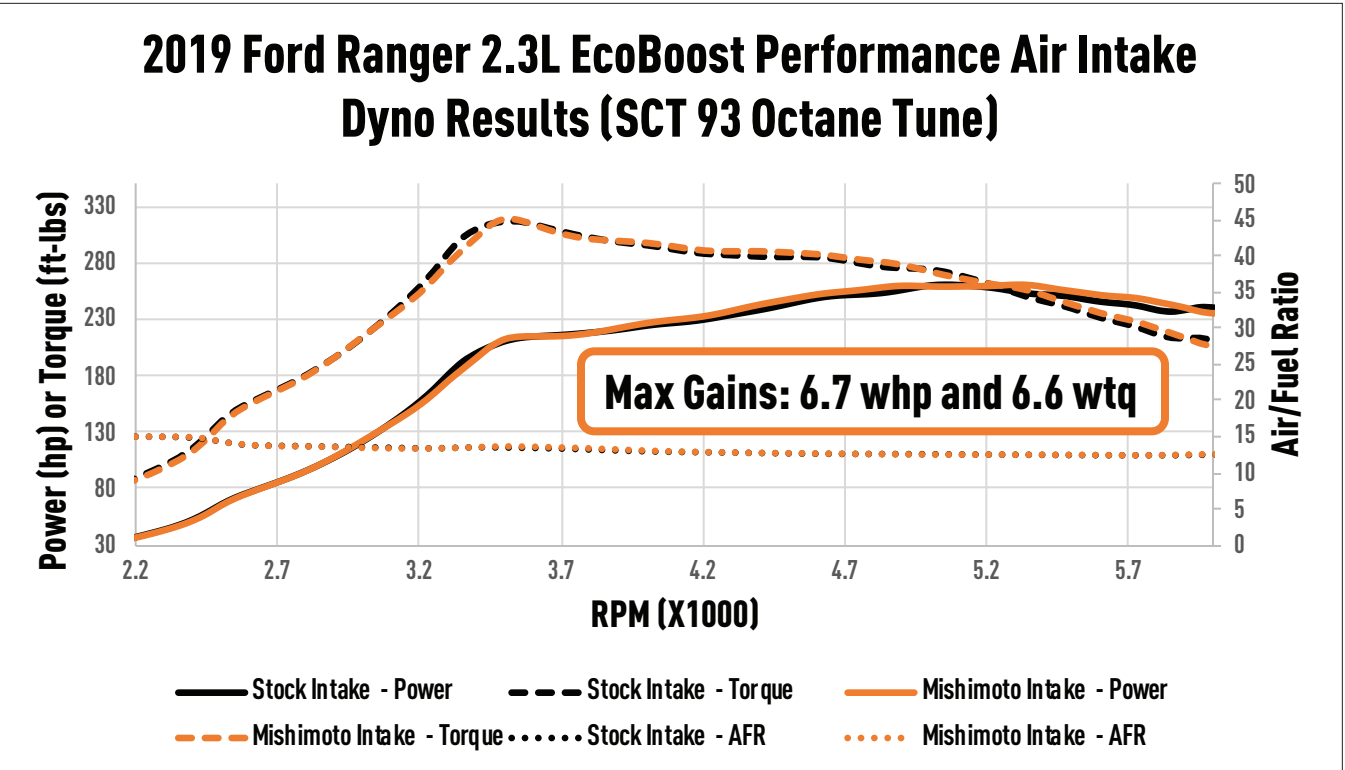


FIGURE 6: Dyno results (SCT 93 octane tune).

2019 Ford Ranger 2.3L EcoBoost Performance Intake Flow Bench Comparison

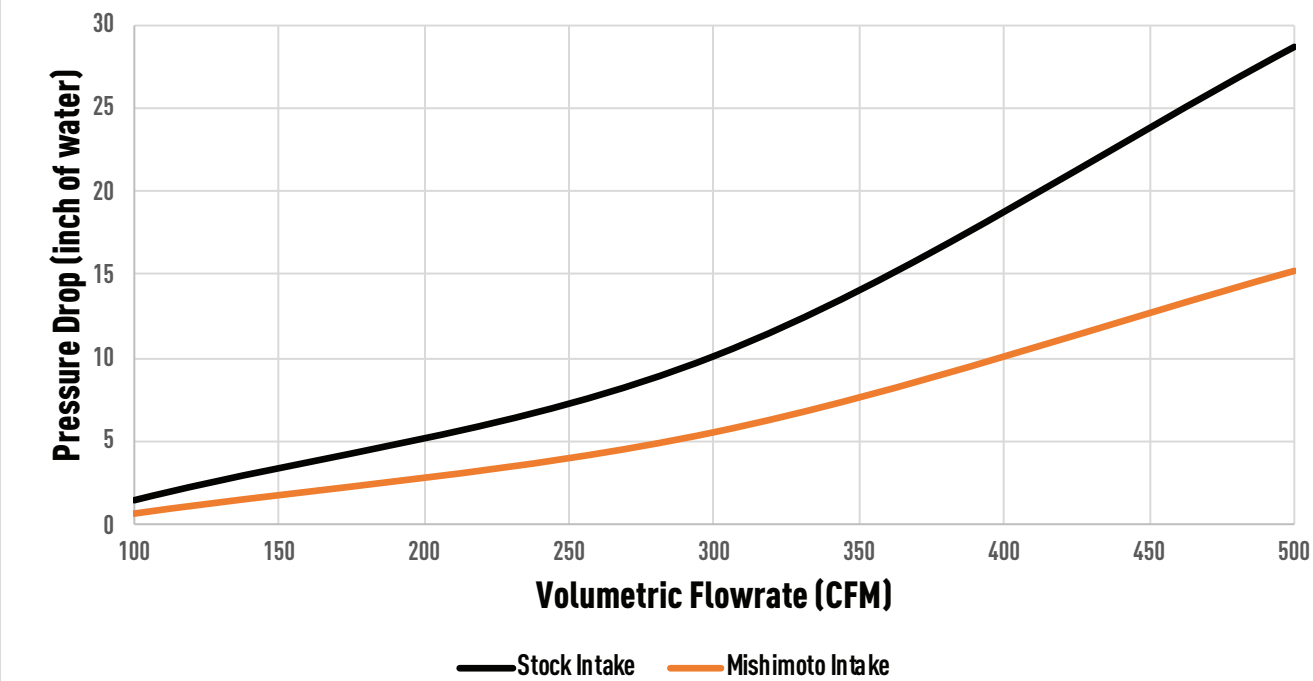


FIGURE 11: The Mishimoto components helped fight the effects of heat soak on an engine by keeping the charge air cooler when entering the engine.

INSTALLATION NOTES

The Mishimoto performance air intake is an excellent bolt-on upgrade for the 2019 Ford Ranger 2.3L EcoBoost and can be installed on a stock vehicle without any permanent modification or custom tuning.

Testing done by

Ye Liu
Product Engineer, Mishimoto Automotive

FOLLOW US

Mishimoto is very active on social media so we can be in constant contact with our customers. Our Social Media Team is available via Facebook, Instagram, Twitter, YouTube, Google+, our Engineering Blog, and forums. We sponsor contests and promotional events, so be sure to follow us.



GoMishimoto



MishimOt0



Mishimoto



Engineering.
Mishimoto.com

CONTACT US

EMAIL

For sales and technical questions please contact support@mishimoto.com

BY PHONE

USA: 877.466.4744
International: +1.302.762.4501
Fax: 302.762.4503

MAIL

Mishimoto
7 Boulden Circle
New Castle, DE 19720

VISIT

Mishimoto.com
Mishimoto.co.uk
Mishimoto.eu

