

ENGINEERING REPORT

2017+ CIVIC TYPE R AIR INTAKE | SKU: MMAI-CTR-17

By Ye Liu, *Mishimoto Product Engineer*

REPORT AT A GLANCE

- **Goal:** To create a high-quality intake for the 2017 Civic Type R
- **Results:** Consistent performance gains at higher RPM range. Improved intake sound compared to the stock system. Safe to run on stock vehicle without a tune. High-flow conical air filter provides increased airflow to the engine. Enclosed air box blocks radiating engine bay heat.
- **Conclusion:** Dyno testing showed max gains of 16.8 hp and 20.1 ft-lbs, peak gains of 12.8 hp and 12.9 ft-lbs compared to stock intake system.

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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 modification to the vehicle

DESIGN AND FITMENTS

The stock intake system of the 2017 Civic Type R uses a rubber scoop to draw fresh air from above the radiator cover and feed it into the airbox. The scoop is open in the front and sealed against the hood with weather stripping at the back, and then tapers down to form a duct that connects to the airbox inlet. This feature is well designed and we decided to keep the scoop on the Mishimoto intake.

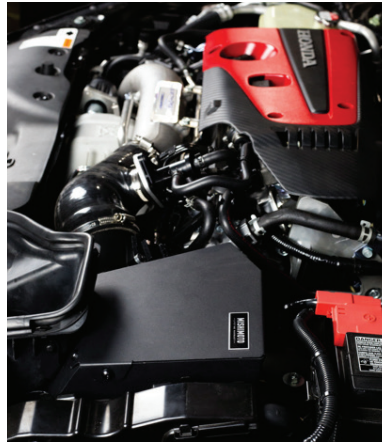


FIGURE 2: Mishimoto intake prototype installed each test.

ScanArm works and how it helps us to design products better.

Next, we evaluated the design space captured by the 3D scan, and selected a high-flow Mishimoto conical filter size suitable for the provided space with maximizing surface area in mind.

After the stock intake was removed from our Type R engineering vehicle, we obtained 3D data of the engine bay using our FARO Design ScanArm. The stock intake system is taken apart and each component is also 3D scanned separately outside the vehicle to provide geometric references later in 3D modeling. Read about how the FARO Design

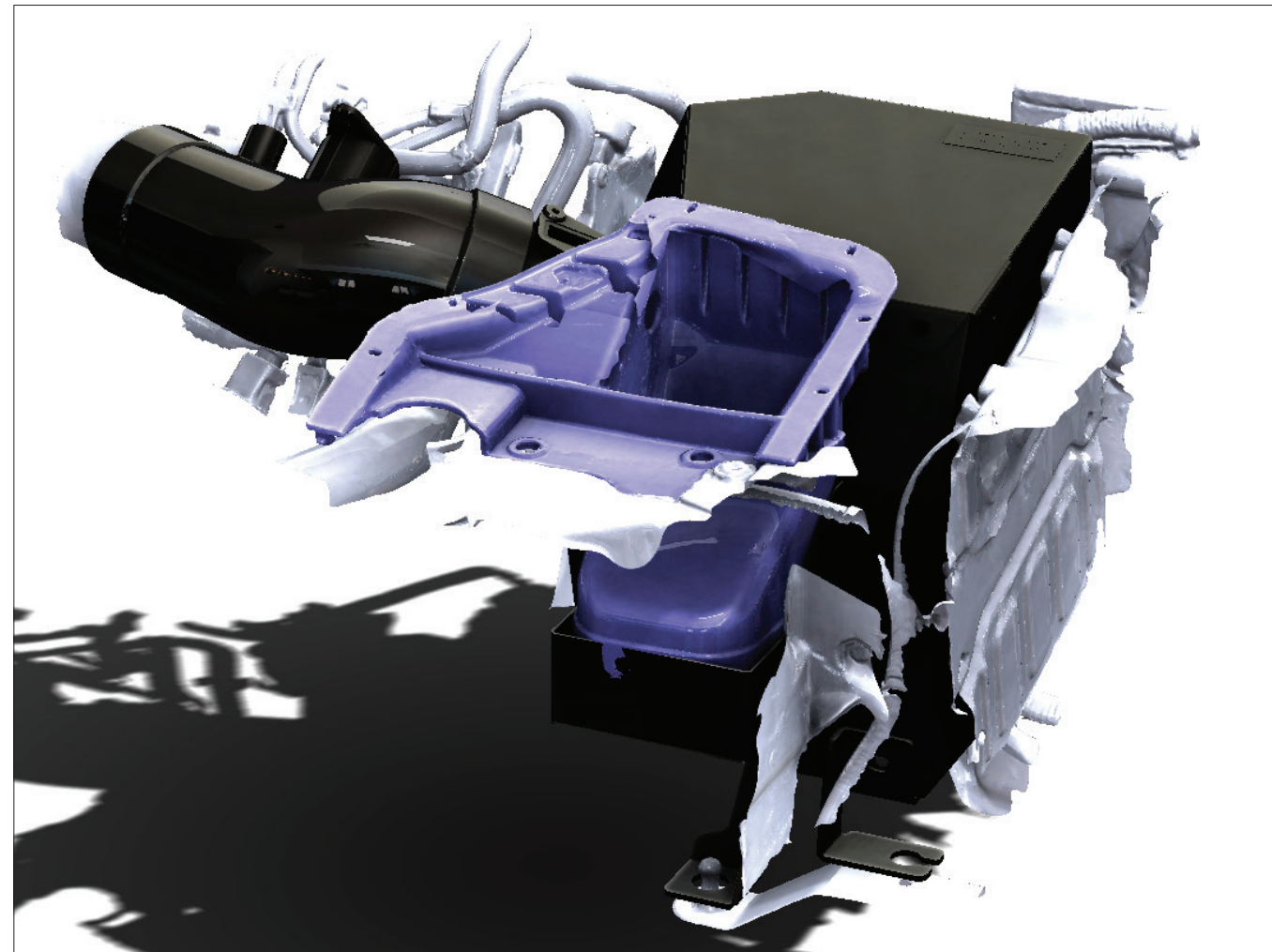


FIGURE 1: Mishimoto intake design created in 3D with the help of 3D scanning

With the help of the 3D scan file, we then created the rest of the design in 3D, and fabricated our first prototype for dyno and street testing.

The Mishimoto intake air-box adapts to the rubber air scoop the same way as the stock airbox did, but with a larger inlet duct. The airbox is mounted in the engine bay, utilizing the original rubber grommet and bushings removed from the stock intake system to provide equivalent vibration isolation. CNC-machined MAF housing is calibrated to keep safe air/fuel ratios and Fuel Trim values. A short silicone hose connects the MAF housing to the turbo inlet, providing larger flow volume and removing restrictive features found with the stock intake hose

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, and pronounces the sound of turbo spool. We recorded stock and Mishimoto intake sounds on a dyno, which can be found on our Engineering Blog at <https://www.mishimoto.com/engineering>

Performance testing was conducted on our in-house DynaPack dynamometer. All testing was done in 4th gear and R mode on our Type R engineering vehicle. Dyno results on performance gain and air/fuel ratio can be found in Figures 3 below and 4 on next page.

The Mishimoto intake showed consistent power gains at higher RPM range, with peak gains of 12.8 hp and 12.9 ft-lbs, max gains of 16.8 hp and 20.1 ft-lbs.

Air/fuel ratio is slightly leaner compared to stock system, but within safe range to run without custom tuning.

Flow bench testing further proved the Mishimoto intake to be 42% less restrictive than the stock intake. See the pressure drop plot shown in Figure 5, on next page.

INSTALLATION NOTES

The Mishimoto performance air intake is an excellent bolt-on upgrade for the 2017 Type R and can be installed on a stock vehicle without any permanent modification or custom tuning.

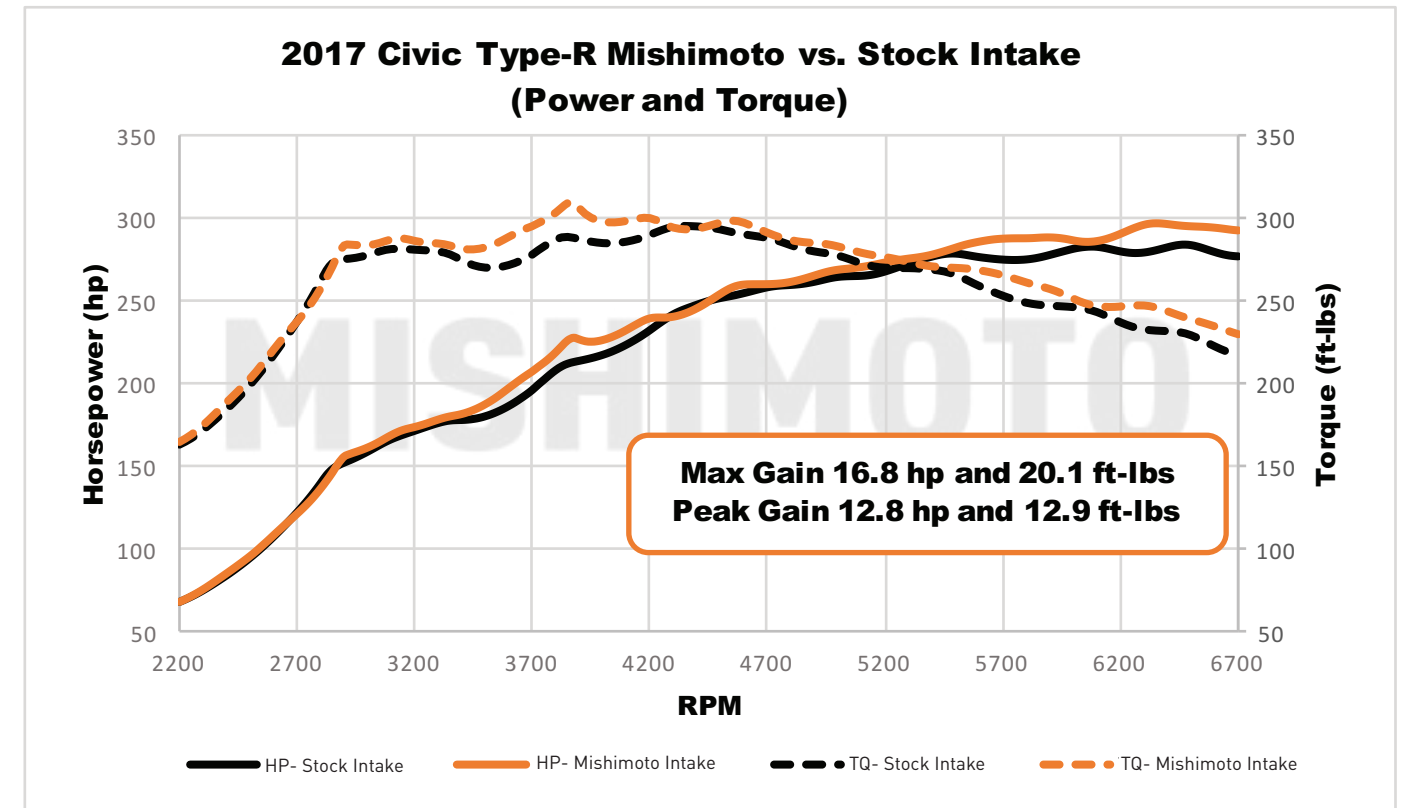


FIGURE 3: Outlet temperatures for each core are compared on the stock tune and after the fifth dyno run of each test.

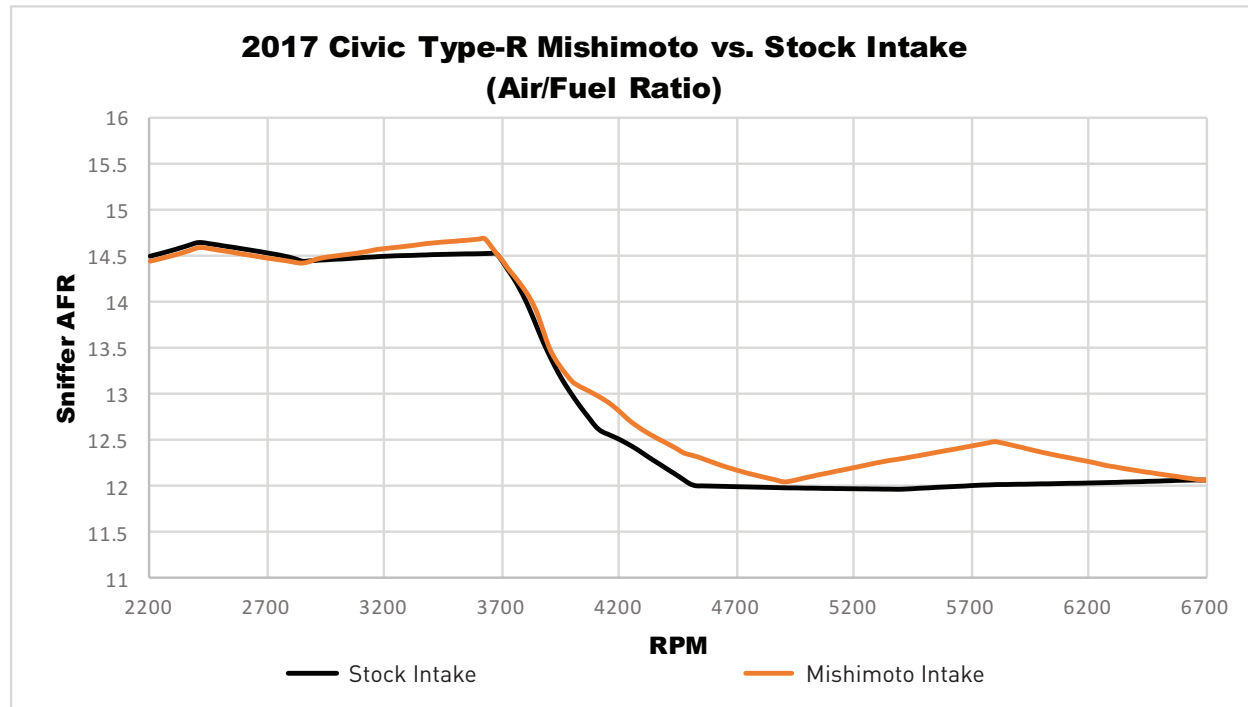


FIGURE 4: Dyno graph (air/fuel ratio)

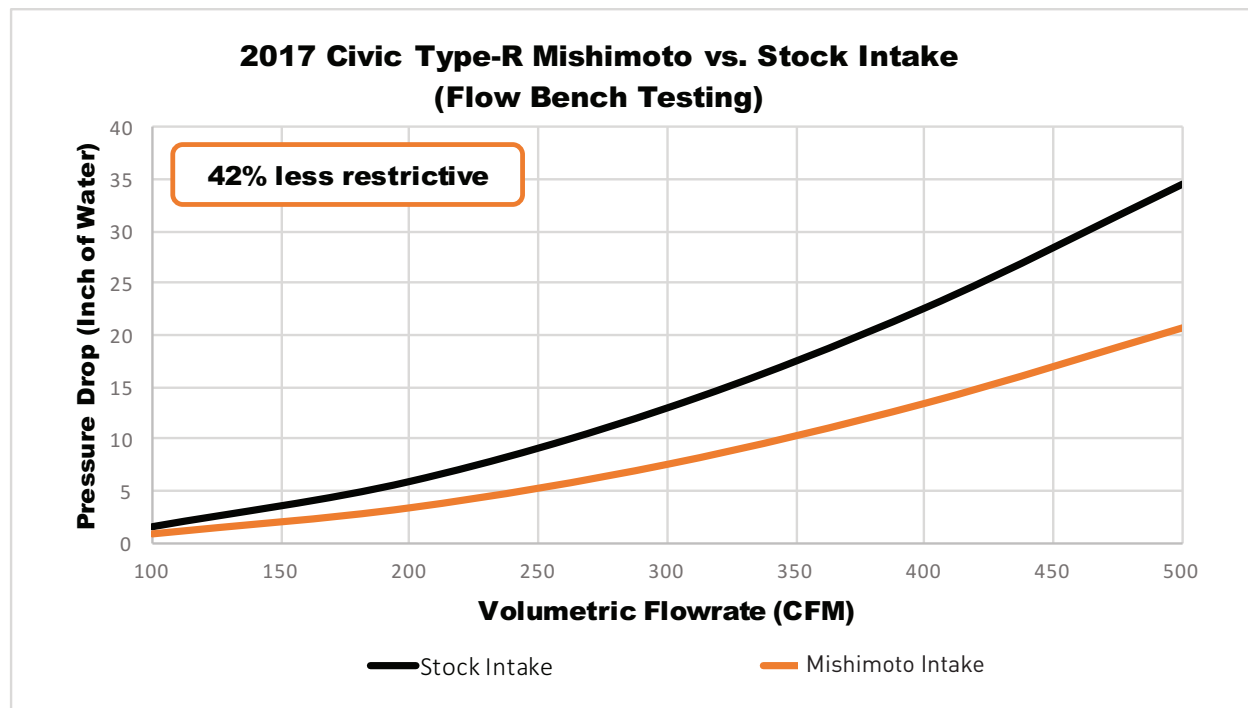


FIGURE 5: Flow bench graph

TESTING DONE BY

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