MISHIMOTO

ENGINEERING REPORT

2016+ Chevy Camaro 2.0T Performance Air Intake | SKU: MMAI-CAM4-16

By Ye Liu, *Mishimoto Engineer*

REPORT AT A GLANCE

- **Goal:** To create a high-quality performance intake for the 2016 Camaro 2.0T.
- **Results:** Consistent performance gains across whole RPM range. Adds a loud, deep, and throaty intake tone compared to the stock system. High-flow conical air filter with integrated velocity stack provides increased and improved airflow to the engine. Steel heat shield blocks radiating engine bay heat and maintains cold, fresh air supply to the filter. Precision-designed intake hose increases airflow rate by maximizing internal volume and minimizing restriction.
- **Conclusion:** Dyno testing showed consistent, impressive horsepower and torque increases across a higher RPM range, with max gains of 21.29 hp and 18 ft-lb over stock intake system.

CONTENTS

DESIGN OBJECTIVES

The design requirements assigned to this project are as follows:

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

DESIGN AND FITMENTS

Our previous R&D efforts for the Camaro vehicles have laid a solid foundation for us to jump start the 2.0T intake design. Location of the heat shield and its mounting points, as well as the size of the high-flow filter were quickly determined with data we collected from the 2016 V8 SS model. The heat shield assembly was mounted to the vehicle by popping three of our CNC-machined mounting pegs into three stock rubber grommets. The assembly is seated just like the stock airbox.

The stock intake of the 2.0T employed a unique muffler noise-reduction feature rather than the regular diaphragm-type sound symposer tube, as show in Figure 1. The muffler is located just before where air enters the turbo, which utilizes a concept similar to an exhaust muffler or a firearm silencer. Filtered air was fed from a 3" hose into a 1.5" hole on the muffler insert, then expanded through many holes lining the inner wall of the muffler insert. While this is an effective way to reduce unwanted intake noise, the muffler structure also created massive restriction on the airflow. We designed an intake hose that will delete the muffler housing and insert to create an unrestricted path for maximized airflow.

For vehicles with mass airflow (MAF) sensors, the MAF housing section is the single most critical component of an aftermarket air intake product. The geometry of this section has a direct impact on MAF reading accuracy, and in turn, the ECU response and overall vehicle performance. With the help of our in-house 3D printers, we were able to fabricate and test an array of MAF housing prototypes to close in on the perfect design. We also incorporate a velocity stack feature on both ends of the MAF housing to reduce air turbulence for more accurate readings.

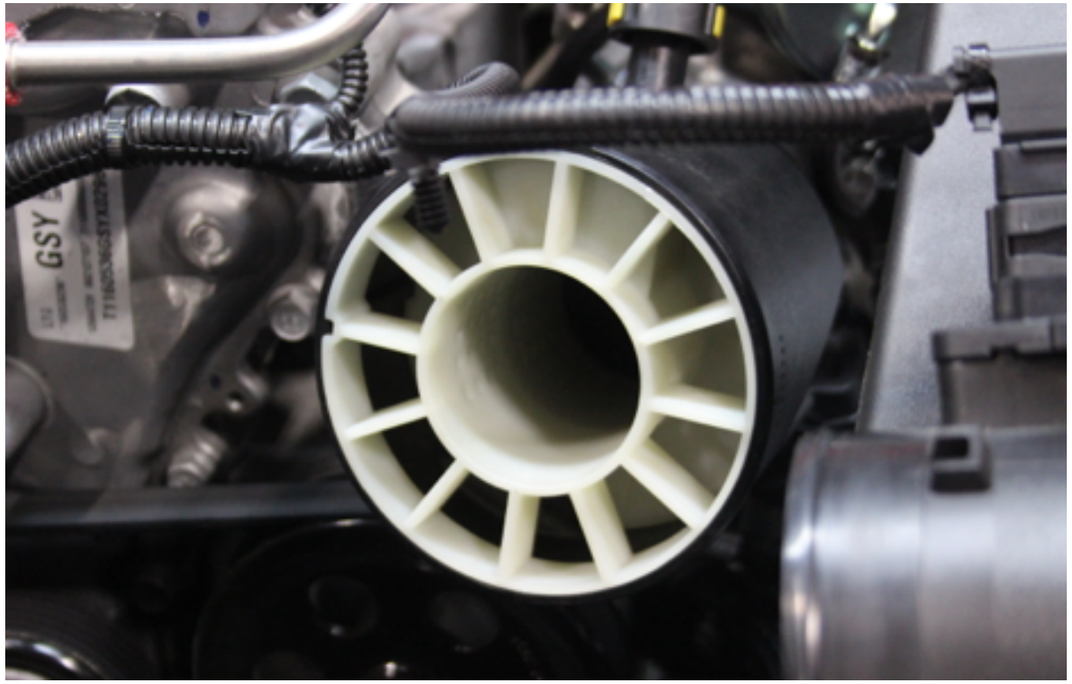

FIGURE 1: *Sound "muffler" located inside stock intake hose.*

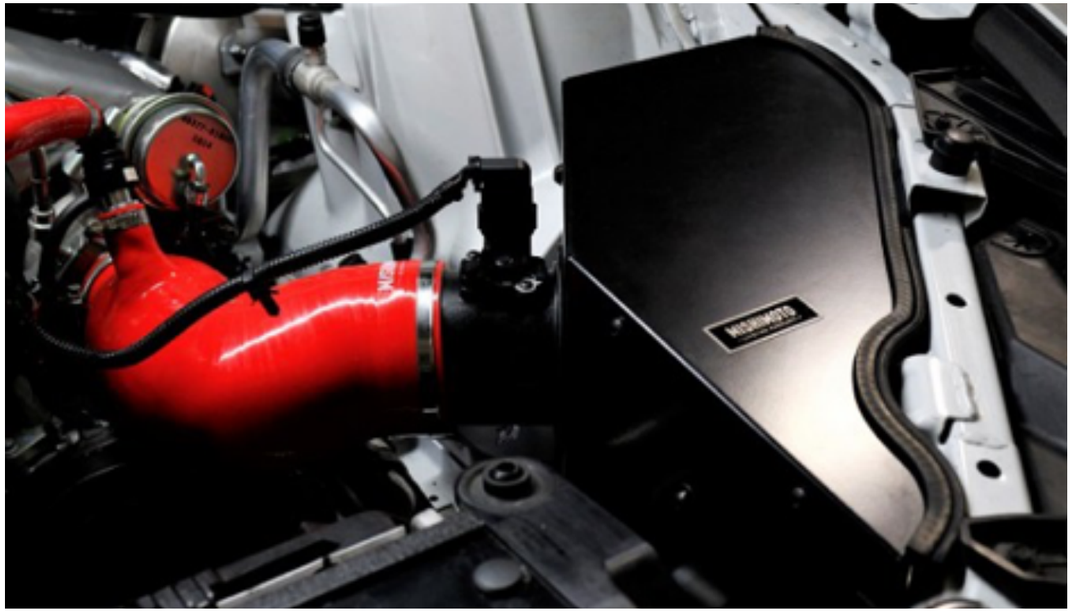

FIGURE 2: *Production sample installed.*

SOUND TESTING

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

MISHIMOTO ENGINEERING BLOG

PERFORMANCE TESTING

The performance testing was carried out on our in-house DynaPack™ dynamometer. All testing was conducted in 4th gear on our engineering vehicle with 6-speed manual transmission. The first test investigated the effect of the stock intake sound muffler. After collecting baseline data we removed the muffler insert from its housing and did dyno pulls with the stock intake again. Dyno results proved that the muffler provides acoustic characteristics only, and its removal does not have a negative impact on vehicle performance.

Next, we installed our intake prototype and road tested for 700 miles to let the ECU "learn" the new intake and for the long term fuel trim to settle down, as shown in Figure 2. Then the vehicle was put back on our dyno for performance testing. Dyno results can be found in Figure 3. Air/fuel ratio is another important aspect of dyno testing. The Mishimoto performance intake showed less than 1% difference from the stock intake at a higher RPM range, as shown in Figure 4, and is considered well within safe range to run on a stock tune.

Flow bench testing further proved the Mishimoto performance intake to be 21% less restrictive than the stock intake—results shown in Figure 5.

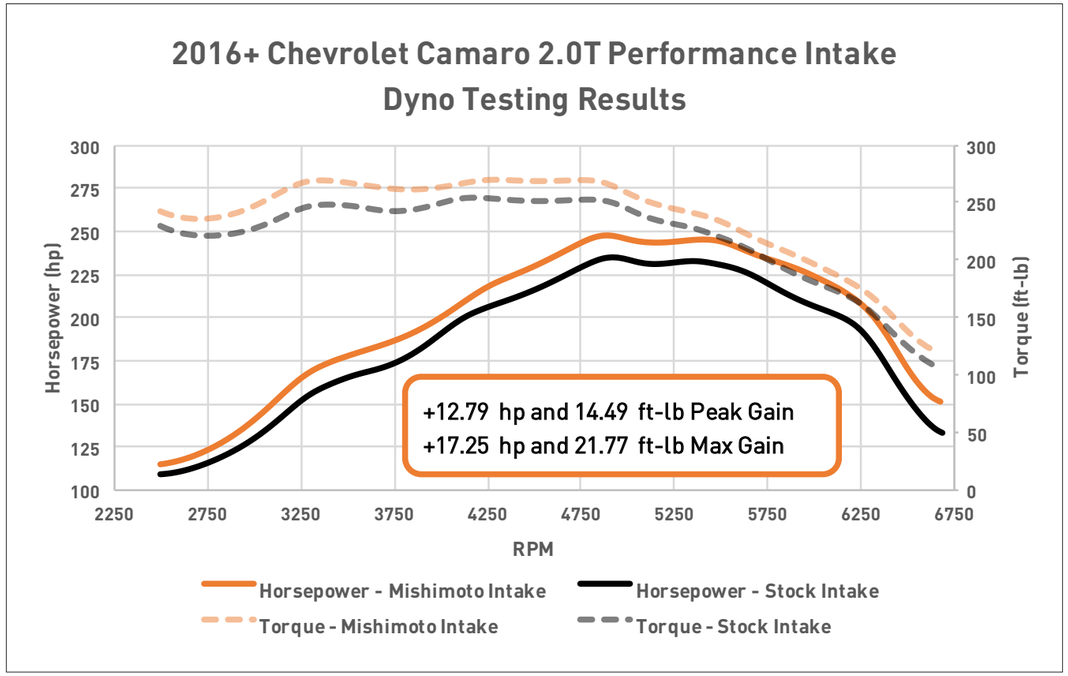

FIGURE 5: *Dyno results (horsepower and torque)*

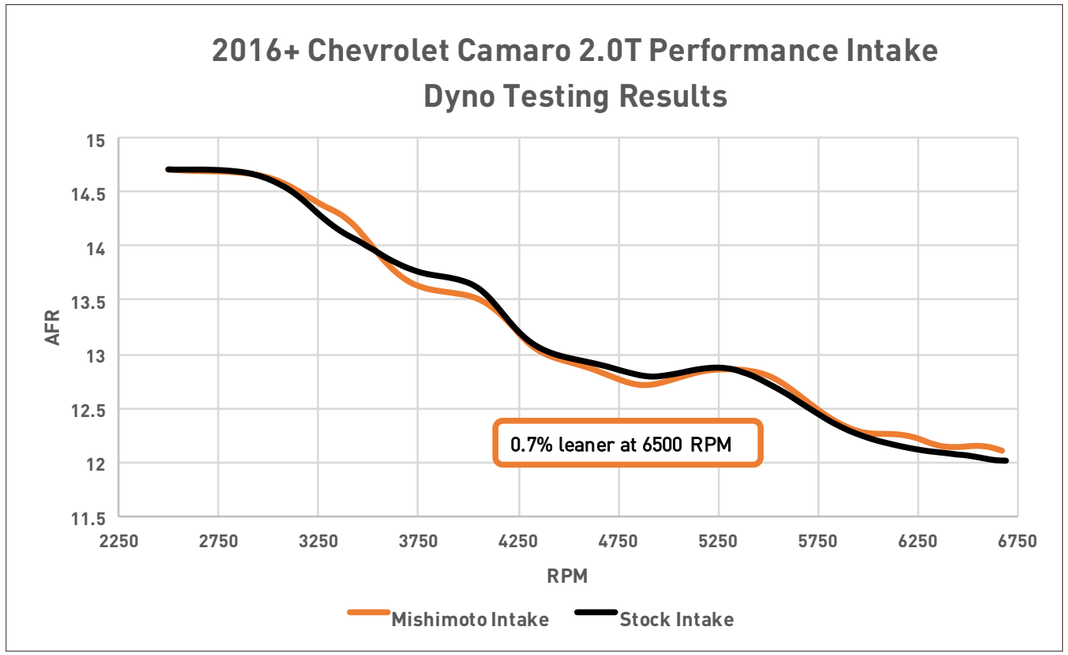

FIGURE 4: *Dyno results (air/fuel ratio)*

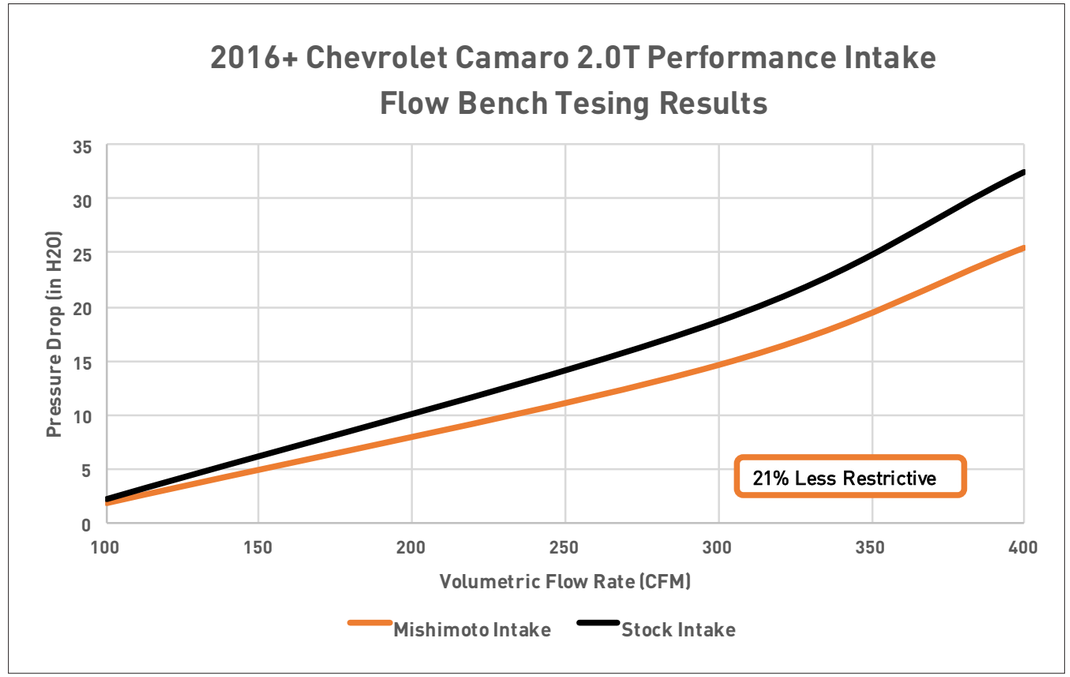

FIGURE 5: *Flow Bench Testing Results*

INSTALLATION NOTES

The Mishimoto Performance Air Intake for the 2016 Camaro 2.0T can be installed on a stock vehicle without any permanent modification or custom tuning.

Ye Liu
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