MISHIMOTO

ENGINEERING REPORT

2016+ Chevy Camaro 2.0T Intercooler Piping | SKU: MMICP-CAM4-16

By Steve Wiley, *Mishimoto Engineer*

REPORT AT A GLANCE

- **Goal:** Design direct-fit intercooler piping that reduces system restriction and improves durability over the stock components.
- **Results:** The Mishimoto intercooler piping showed respectable power gains of up to 11 hp and 9 ft-lb of torque. This increase is likely due to the mandrel-bent aluminum piping's ability to reduce overall system restriction, and its resistance to expansion under full boost.
- **Conclusion:** This piping kit is far more durable than the stock plastic and rubber pieces, and will fit in the Camaro without any cutting or permanent modification needed. The Mishimoto intercooler pipes help to improve power and flow, increase durability, and create a more aesthetically pleasing engine bay.

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DESIGN OBJECTIVES

The design requirements assigned to this project are as follows:

- Design intercooler piping that improves flow and reduces overall system restriction.
- Must be a direct fit with no cutting or permanent modification necessary.
- Piping should include an NPT-tapped bung to allow customers to run a methanol injection system if desired.

DESIGN AND FITMENTS

We began the R&D process by evaluating the stock piping and finding potential room for improvement. The stock hot-side pipe is relatively small and includes bends that can be reduced. The Mishimoto pipe increases internal volume by 29% and is made to reduce bends where possible to improve flow. The same approach was used when designing the cold-side piping. Internal volume was increased by 31% and an NPT-tapped bung was included in the design of the cold-side pipe to support a methanol injector if desired.

FIGURE 1: *The Mishimoto intercooler piping is made from mandrel-bent aluminum piping to reduce bend angles and improve flow.*

As shown in Figure 1, the Mishimoto intercooler piping features mandrel-bent aluminum, silicone couplers, and CNC quick-disconnect fittings to ensure a reliable and direct fit.

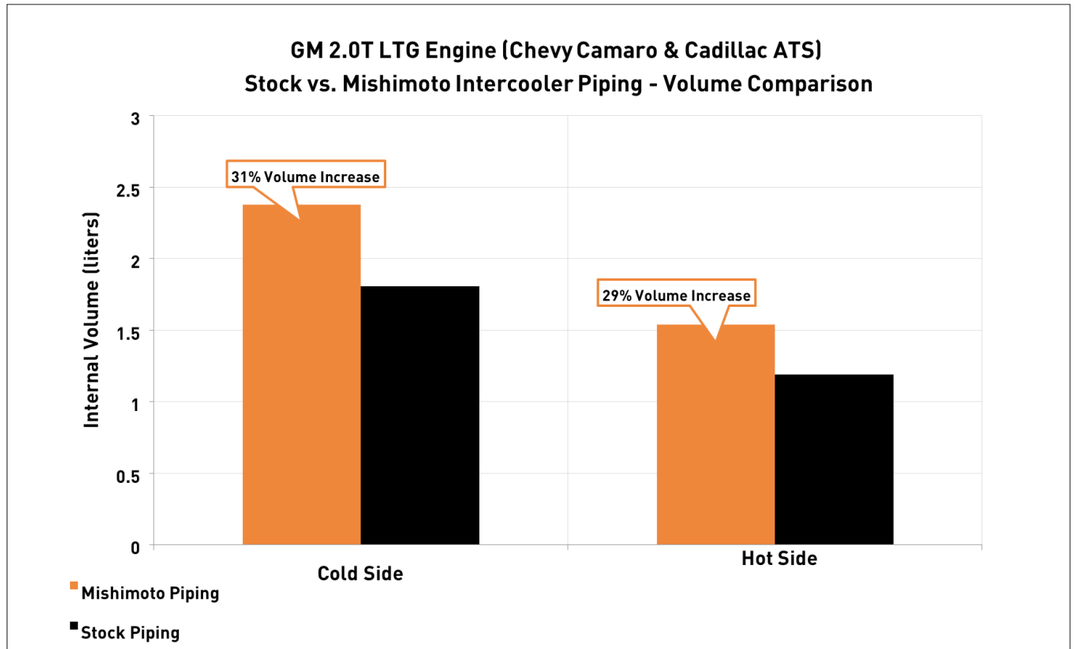

FIGURE 2: *The Mishimoto intercooler piping increases internal volume when compared to stock. This helps to reduce system restriction caused by the piping.*

More information on the R&D process for the intercooler can be found on the Mishimoto engineering blog:

MISHIMOTO ENGINEERING BLOG

PERFORMANCE TESTING

A completely stock 2016 Chevy Camaro was used for testing. The ambient temperature on the day of testing was approximately 65°F (18°C) with 45% humidity. To test the performance increases of the intercooler pipes, a Dynapack™ dynamometer was used to record horsepower (HP) and torque (TQ) output of the vehicle.

To test the performance gains of the Mishimoto intercooler piping, the Camaro was bolted to the Dynapack, and baseline pulls were made on the completely stock car. The same test was performed with both the Mishimoto hot-side and cold-side pipes installed. The average dyno plot from each test was chosen and plotted against the average baseline pull. These results are shown in Figure 4 below.

FIGURE 3: *A Dynapack™ dynamometer was used for vehicle testing.*

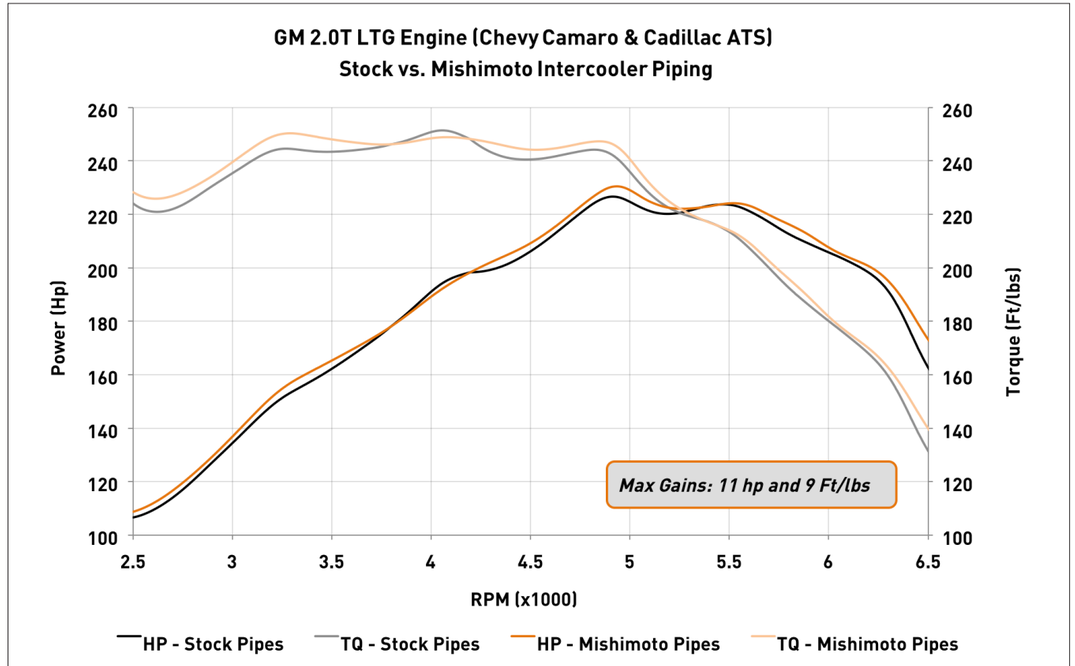

FIGURE 4: *The Mishimoto intercooler piping showed top-end power and torque gains when compared to a fully stock car.*

The Mishimoto intercooler piping created power over stock, especially as the engine approached redline.

Due to less overall restriction in the system and a more free-flowing design, the Mishimoto intercooler piping made max gains of 11 hp and 9 ft-lb of torque.

Because the Mishimoto piping is made from mandrel-bent aluminum and 5-ply silicone, it will better resist expansion under high boost pressures when compared to the stock rubber hose portions.

A flow bench was used to determine the increase in flow provided by the Mishimoto intercooler piping. The flow bench can measure pressure drop at a specified flow and can therefore show a relative change from the stock to Mishimoto intercooler piping design. The cold-side piping showed similar results, which was expected as the packaging of the Camaro does not allow for much reduction of bend angles. The hot-side piping showed a flow increase of up to 20%, which is likely due to the increased volume that immediately follows the turbo outlet. The results for flow testing can be seen below in Figure 5.

The Mishimoto intercooler piping reduces pressure drop, which translates to reduced restriction. This reduced restriction will allow the engine to breathe better as it requires less effort to move the air from the turbo to the throttle body.

Steve Wiley
Product Engineer, Mishimoto Automotive

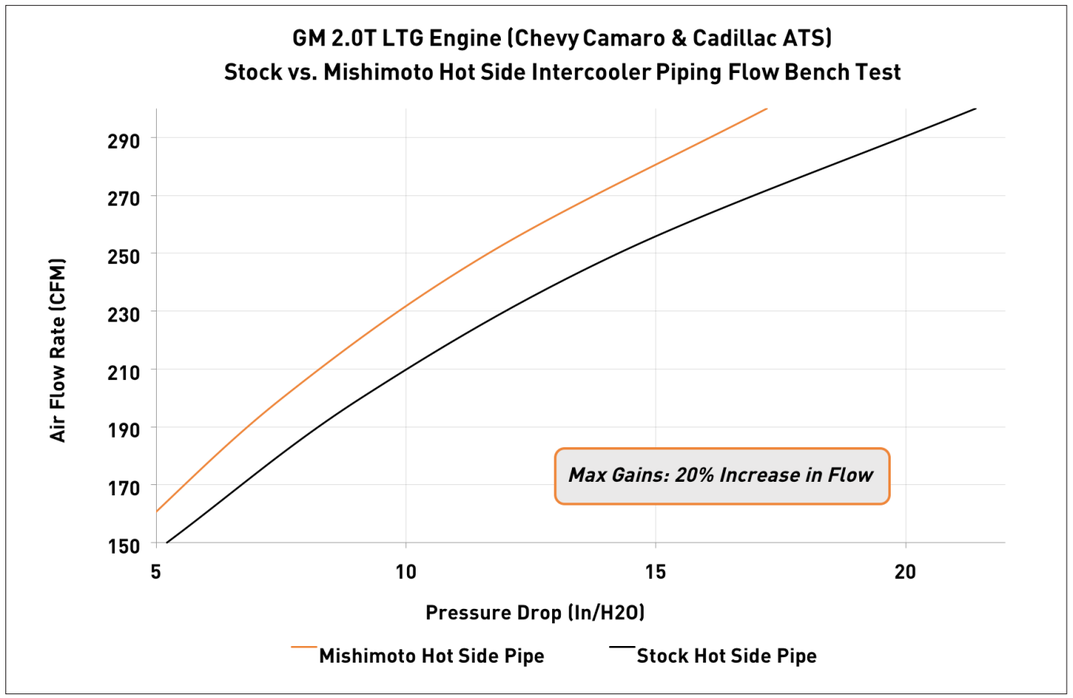

FIGURE 5: *The Mishimoto intercooler piping flows up to 20% better than the stock design*

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Engineering.
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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
18 Boulden Circle, Suite 10
New Castle, DE 19720

VISIT
Mishimoto.com
Mishimoto.co.uk
Mishimoto.eu

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