MISHIMOTO

ENGINEERING REPORT

2016+ CAMARO 2.0T OIL COOLER KIT | SKU: MMOC-CAM4-16

By Steve Wiley, *Mishimoto Engineer*

REPORT AT A GLANCE

- **Goal:** Create an oil cooler that outperforms the stock configuration. The Mishimoto cooler should fit directly into the Camaro without any cutting or modification required.
- **Results:** The Mishimoto oil cooler showed temperature drops of over 60°F when compared to the stock HD package cooler. This temperature reduction came with very little pressure drop when compared to the stock configuration. The oil cooler, lines, and sandwich plate fit the Camaro 2.0T without any permanent modifications needed.
- **Conclusion:** The Mishimoto Oil Cooler is a valuable upgrade for Camaro 2.0T owners who drive their vehicles on tracks or in hot climates. The additional oil cooler ensures that oil temperatures stay at optimal values during all driving conditions.

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DESIGN OBJECTIVES

The design requirements assigned to this project are as follows:

- Create an oil cooler package that reduces fluid temperatures when compared with the stock configuration.
- Must be a direct fit, with no cutting or permanent modification necessary.
- The Mishimoto cooler must not show a significant pressure loss when compared to the stock cooler.

DESIGN AND FITMENT

The R&D process began by evaluating the stock system and understanding how it cools the oil. Chevy utilizes a liquid-to-air heat exchanger when the HD cooling package is equipped. Without the HD cooling package, the oil is cooled using only a liquid-to-liquid cooler, which uses engine coolant to draw heat away from the engine oil. This system works well, assuming the radiators function correctly and keep up with the heat output from the engine. During track days and spirited driving in hot conditions, this configuration will begin to reach its limits. To combat this limitation, we've placed a Mishimoto 25-row liquid-to-air heat exchanger in front of the lower grille opening of the Camaro (Figure 1 above). Direct-fit brackets were used directly from the 2016 Camaro SS oil cooler kit to mount the oil cooler in place. A sandwich plate was used to direct the oil to and from the cooler, and stainless steel lines were created to connect the oil cooler to the sandwich plate.

FIGURE 1: *The Mishimoto oil cooler was mounted in front of the lower grille opening for optimal airflow.*

More information on the R&D process for the intake can be found on the Mishimoto Engineering Blog here:

[Mishimoto Chevrolet Camaro 2.0T Oil Cooler]

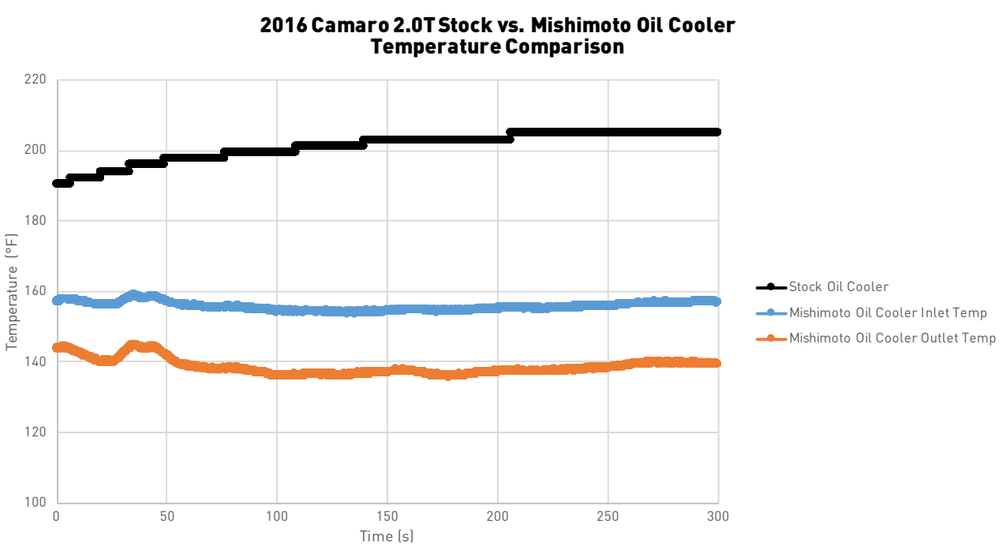

FIGURE 2: *The Mishimoto Oil Cooler kept temperatures more than 60°F lower than did the stock cooler.*

PERFORMANCE TESTING

The Camaro was tested on a mild, sunny day with an ambient temperature of approximately 75°F (23.9°C) and 40% humidity. To test the performance of the oil cooler, the Camaro was driven at 65 mph on a highway until steady-state conditions were reached. The same test was performed initially with only the stock configuration, and then again with the Mishimoto oil cooler installed. It should be noted that the Camaro used for testing came equipped with the optional HD cooling package from Chevy. Camaros that do not include this package are not equipped with a liquid-to-air oil cooler. Temperature and pressure sensors were installed during each test, and the results of these tests are shown below in Figures 2 (page 1) and 3.

The Mishimoto oil cooler showed an average temperature drop of 17°F from inlet to outlet, and a maximum temperature drop of 63°F when compared to the stock configuration.

Given these results, it's clear that the Mishimoto oil cooler is a significant upgrade for the stock liquid-to-air heat exchanger, and even greater results can be expected when the oil cooler is added to a 2.0T Camaro without the HD cooling package.

Along with temperature, pressure was also recorded during testing to ensure that no significant pressure drop or rise occurred due to the additional cooler. A large pressure drop could lead to improper engine lubrication, whereas too much of a pressure rise could cause premature oil pump failure.

As seen in Figure 3, the addition of the Mishimoto Oil Cooler caused a slight pressure rise (3–5 psi over stock) before entering the core. Once the pressure drops across the core, the system behaves similarly to stock. This small rise in pressure is acceptable and will not harm the LTG motor.

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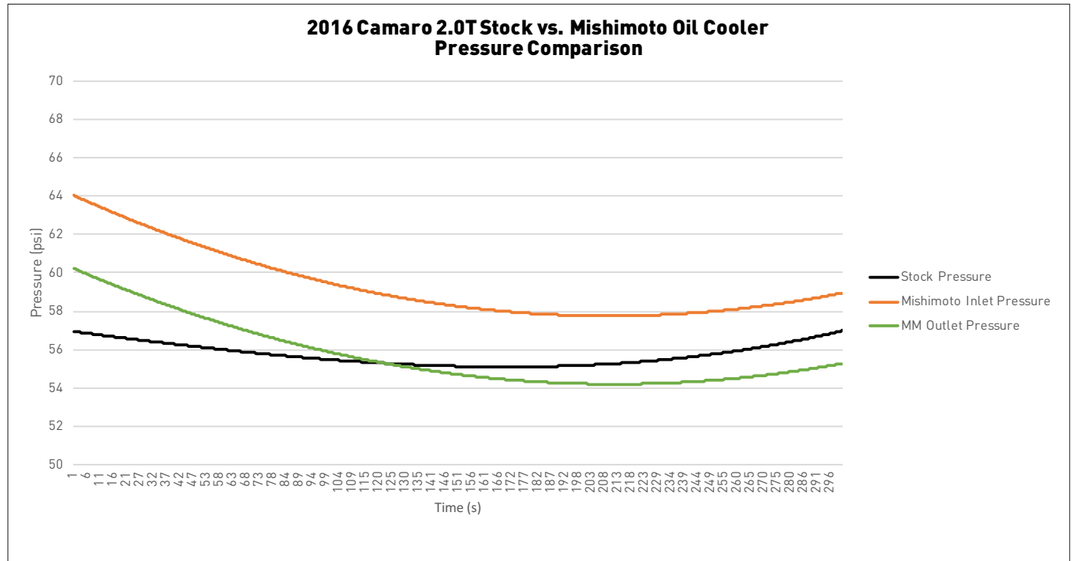

FIGURE 3: *The Mishimoto oil cooler shows a slight pressure rise before entering the core. Post-core oil pressure is similar to stock.*

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