



# ENGINEERING REPORT

## Chevrolet Camaro SS Oil Cooler | SKU: MMOC-CAM8-16

By Steve Wiley, *Mishimoto Engineer*

### REPORT AT A GLANCE

- **Goal:** Create an oil cooler that outperforms the stock liquid-to-liquid option. The Mishimoto cooler should fit directly without any cutting or modification required.
- **Results:** The Mishimoto oil cooler showed temperature drops of up to 40°F when compared to the stock configuration. This temperature reduction came without any pressure drop when compared to the stock cooler. The oil cooler, lines, and sandwich plate fit the Camaro SS without any permanent modifications needed.
- **Conclusion:** The Mishimoto Oil Cooler is a valuable upgrade for those who drive their Camaro on tracks or in hot climates. The addition of a oil cooler ensures that oil temperatures stay at optimal values.

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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.

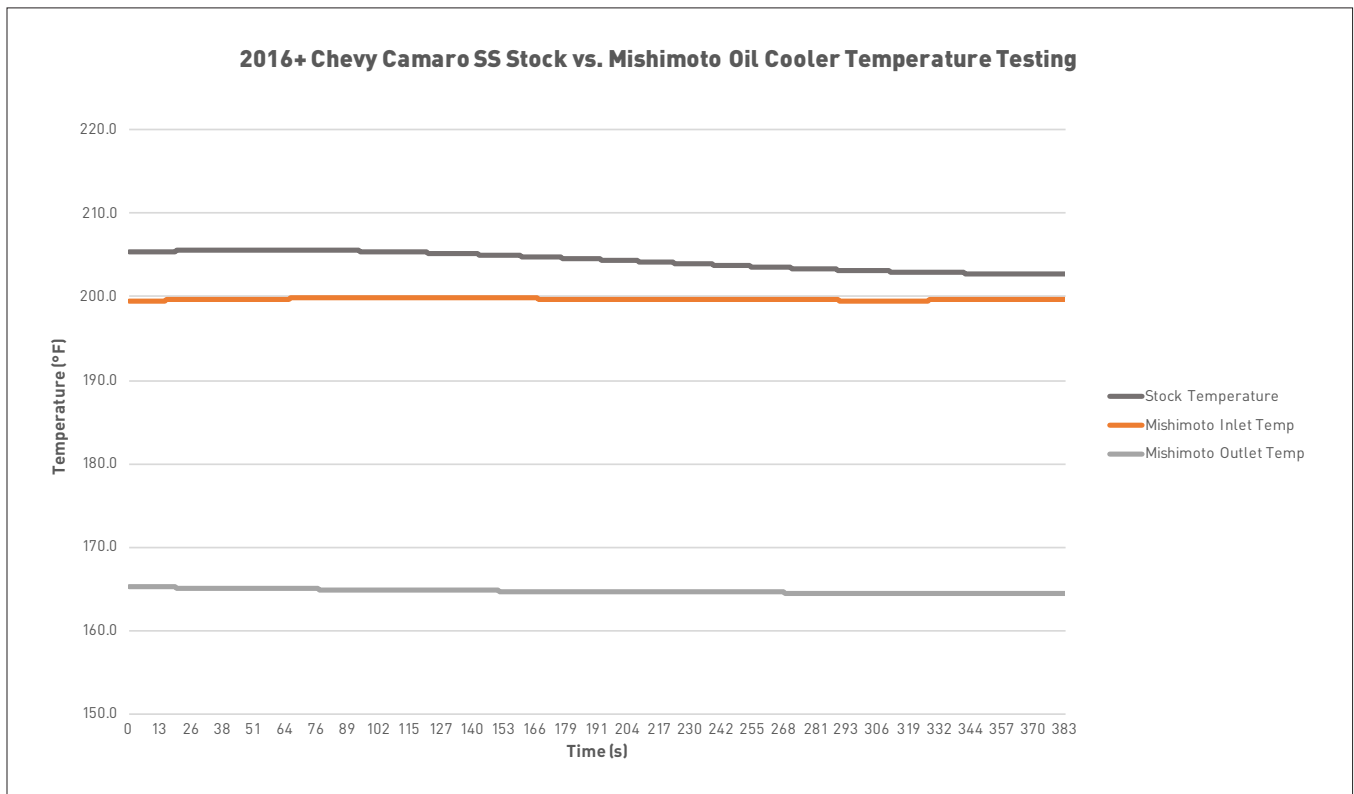
## DESIGN AND FITMENTS

The R&D process began by evaluating the stock system and understanding how it cools the oil. Chevy utilizes a liquid-to-liquid heat exchanger that 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).



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



**FIGURE 2:** *The Mishimoto Oil Cooler kept temperatures up to 40°F lower than did the stock cooler.*

Direct-fit brackets were created to mount the oil cooler in place, and a sandwich plate was used to direct the oil to and from the cooler. Stainless steel lines were created to connect the oil cooler to the sandwich plate. Making this connection was one of the more challenging aspects when designing the kit, as Chevy did an excellent job in packaging the front end of the Camaro.

More information on the R&D process for the intake can be found on the Mishimoto Engineering Blog here: <http://engineering.mishimoto.com/category/chevrolet-camaro-ss-oil-cooler-kit-2016/>

## PERFORMANCE TESTING

The Camaro was tested on a mild, sunny day where ambient temperature was approximately 80°F (26.7°C) with 20% 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. Temperature and pressure sensors were installed during each test. The results of these tests are shown below in Figures 2 and 3.

**The Mishimoto oil cooler showed an average temperature drop of 35°F from inlet to outlet, and a maximum temperature drop of 40°F when compared to the stock configuration.**

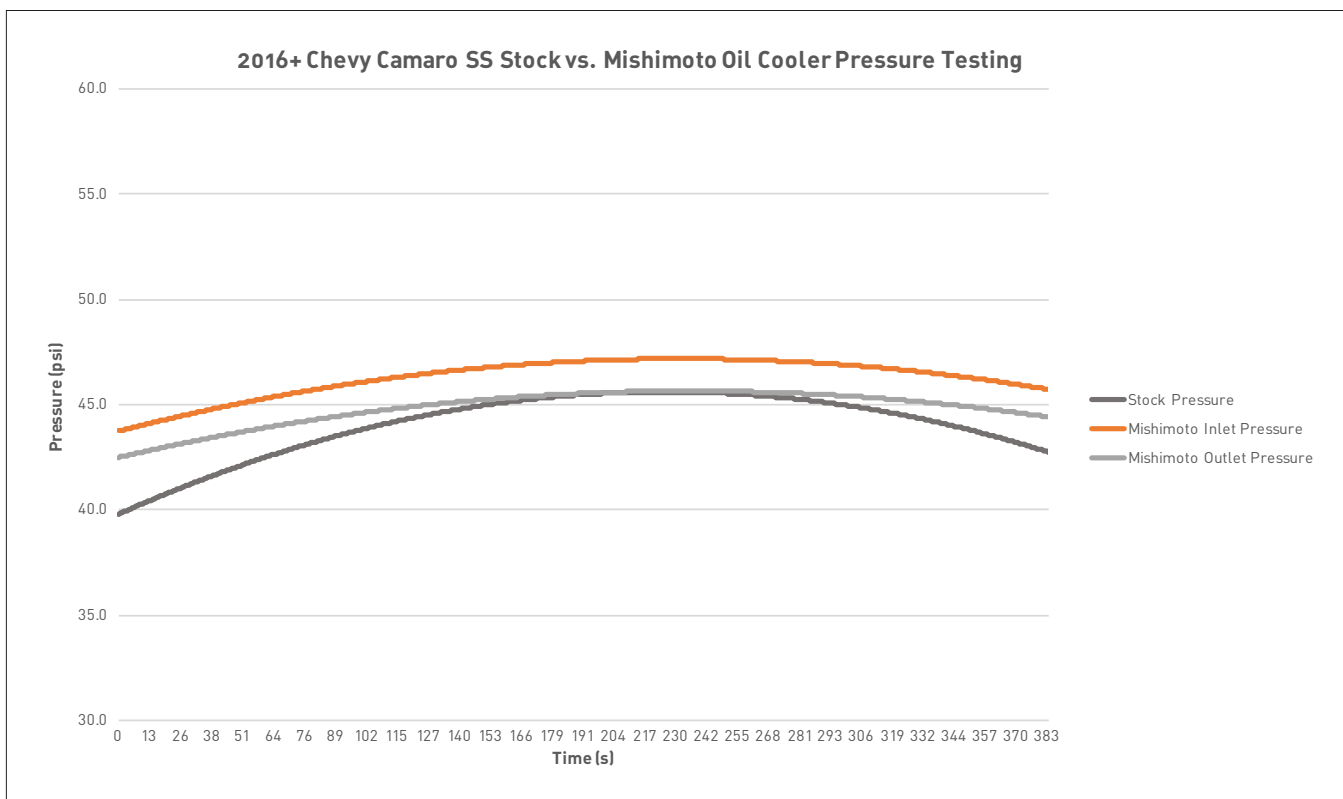
Given these results, it's clear that the Mishimoto oil cooler is a significant upgrade for the stock liquid-to-liquid heat exchanger.

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 (2–3 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 LT1 motor.

**-Steve Wiley**

Product Engineer, Mishimoto Automotive



**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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