



ENGINEERING REPORT

2010-2015 CHEVROLET CAMARO SS OIL COOLER | SKU: MMOC-CSS-10

By Jason Wettig, *Mishimoto Product Engineer*

REPORT AT A GLANCE

- **Goal:** Create an oil cooler that outperforms the stock liquid-to-liquid option. The Mishimoto cooler should fit directly into the Camaro without any cutting or modification required.
- **Results:** The Mishimoto Oil Cooler showed temperature drops of up to 42°F when compared to the stock configuration. This temperature reduction came with a minimal pressure drop of less than 3 psi 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 Camaro SS owners who drive their vehicles on tracks or in hot climates. The additional oil cooler ensures that oil temperatures stay at optimum 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.
- Must allow for the usage of forced induction systems which utilize the lower space of the front grill.
- 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-liquid heat exchanger that works with engine coolant to draw heat away from the engine oil, dumping hot coolant into the radiator. 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 overcome the issues associated with hot oil, and keep drivers running safer and longer on the tracks, we've placed a Mishimoto 25-row liquid-to-air heat exchanger up top in the grille (Figure 1). The direct-fit bracket picks up two M8-threaded inserts on the top support bar to keep the oil cooler in place. A sandwich plate was used to direct the oil to and from the cooler. Stainless steel lines then connect the oil cooler to the sandwich plate. The lines route up through the engine bay and around the radiator. Some nice weatherstripping was added to prevent damage to the radiator from the oil lines rubbing against it.



FIGURE 1: The Mishimoto oil cooler was mounted in front of the upper grill opening to allow for intercoolers on forced induction cars.

More information on the R&D process for the intake can be found on the Mishimoto Engineering Blog here: <https://engineering.mishimoto.com/2017/03/cold-heart-camaro-oil-cooler-rd-part-2/>

PERFORMANCE TESTING

The Camaro was tested on a mild, sunny day where ambient temperature was approximately 80°F (26.7°C) with 26% humidity. To test the performance of the oil cooler, the Camaro was driven at 60 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 in Figures 2 and 3.

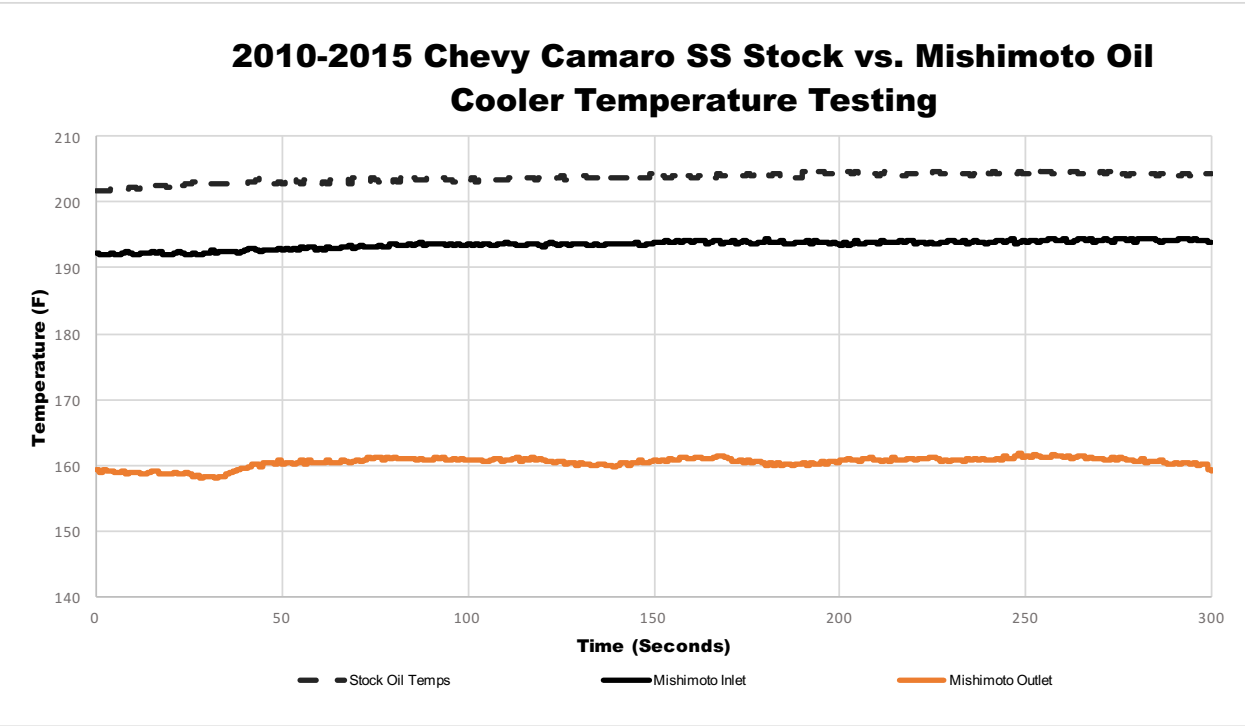


FIGURE 2: The Mishimoto Oil Cooler kept temperatures up to 42°F cooler when compared to the completely stock car.

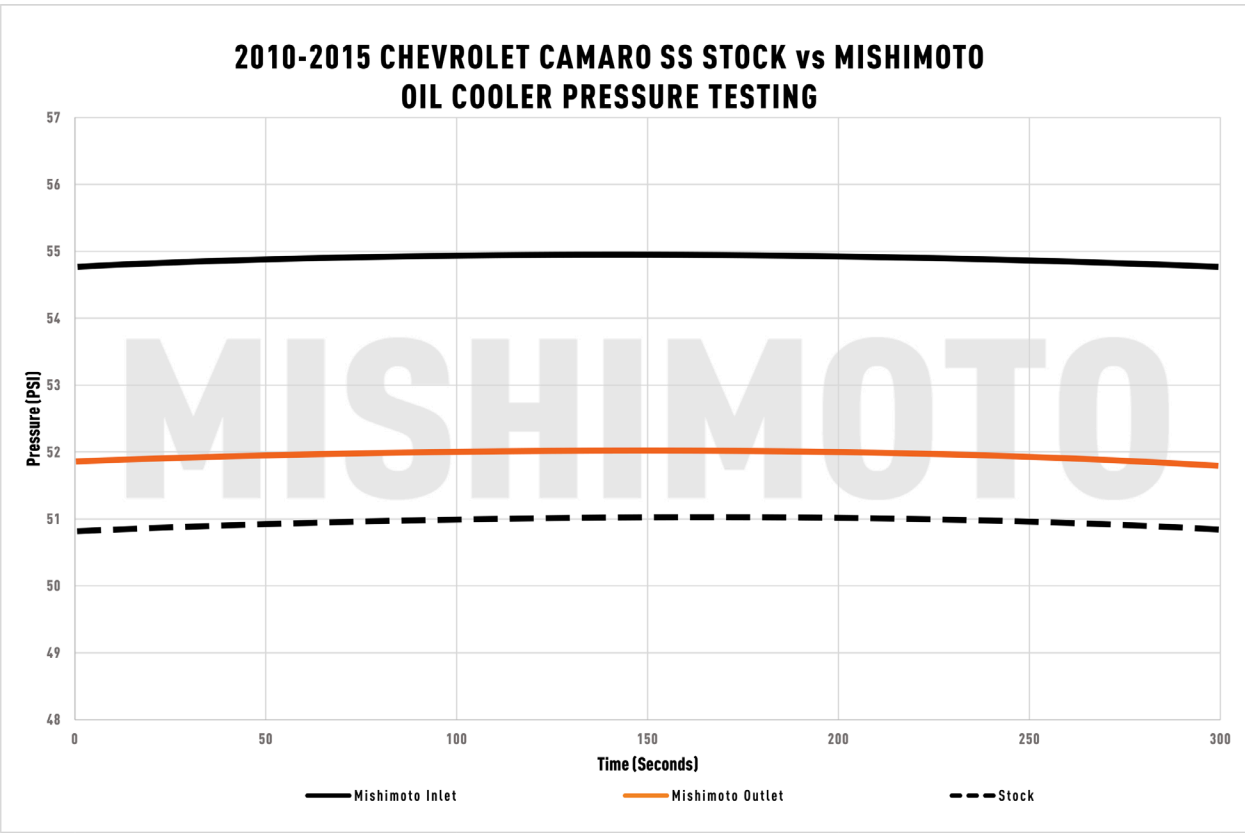


FIGURE 3: The Mishimoto Oil Cooler shows a slight pressure rise before entering the core. Post-core oil pressure is similar to stock.

The Mishimoto Oil Cooler showed an average temperature drop of 31°F from inlet to outlet, and a maximum temperature drop of 42°F when compared to the stock configuration.

Given these results, it's clear that the Mishimoto Oil Cooler is a significant upgrade over 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 (3-4 psi over stock) before entering the core. Once the pressure drops across the core, the system behaves similarly to stock with only a 1 psi difference. This small rise in pressure is acceptable and will not harm the LS3 motor.

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