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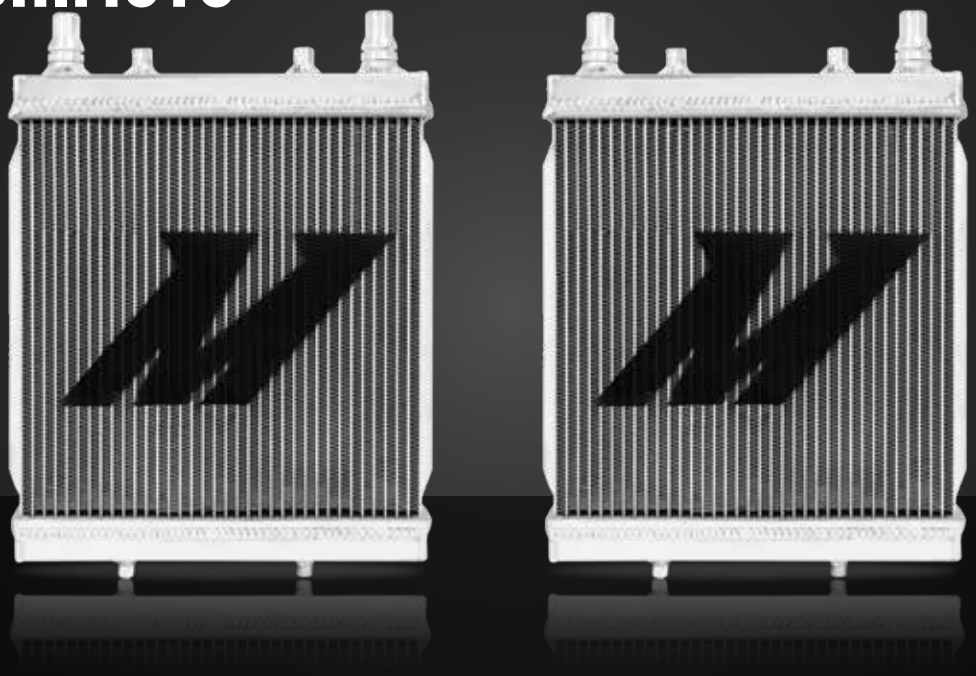

ENGINEERING REPORT

Chevrolet Camaro SS Auxiliary Radiators | SKU: MMRAD-CAM8-16S

By Steve Wiley, *Mishimoto Engineer*

REPORT AT A GLANCE

- **Goal:** Create an auxiliary radiator that outperforms the stock unit. The Mishimoto cooler should fit directly into the Camaro without any cutting or modification required.

- **Results:** the Mishimoto auxiliary radiator showed temperature drops of up to 8°F when compared to the stock radiator. The increased fin surface area promotes greater heat transfer and takes advantage of the well-designed air ducting in the front of the Camaro.

- **Conclusion:** The Mishimoto auxiliary radiator is a valuable upgrade for Camaro SS owners who drive their vehicles on tracks or in hot climates. The upgraded heat exchanger helps to ensure that coolant 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 auxiliary radiator package that reduces fluid temperatures when compared with the stock configuration.
- Must be a direct fit, with no cutting or permanent modification necessary.

DESIGN AND FITMENTS

We bagan the R&D process began by evaluating the stock system and understanding how Chevy chose to package their coolant heat exchangers. All Camaro SS models feature a large primary radiator along with two smaller auxiliary radiators that sit in front of each wheel. Coolant is dispersed to each of the three radiators where the relatively cool fluid collects in the outlet hose. Upon removing the front bumper from the Camaro, it becomes immediately clear that a good deal of thought was put into the shrouding and ducting for the cooling system. Proper ducting means that the cores of each

heat exchanger can be relatively tight, as passing through the core will still be the path of least resistance for airflow. While the design of the Camaro doesn't leave much room to increase the auxiliary radiator core sizes, the ducting allows for an increase in fin surface area, which will aid in increasing heat transfer.

As shown in Figure 2, the Mishimoto auxiliary radiator increases external fin surface area by 14%. This is achievable due to the well-designed ducting in the front of the Camaro. More information on the R&D process for the intake can be found on the Mishimoto Engineering Blog here: **https://engineering.mishimoto.com/category/svp-vehicles/svp-vehicle-2016-chevy-camaro-ss/chevrolet-camaro-ss-auxiliary-radiators-2016/**

FIGURE 1: *The Camaro auxiliary radiators are mounted on either side of the primary radiator and aid in keeping coolant temps low.*

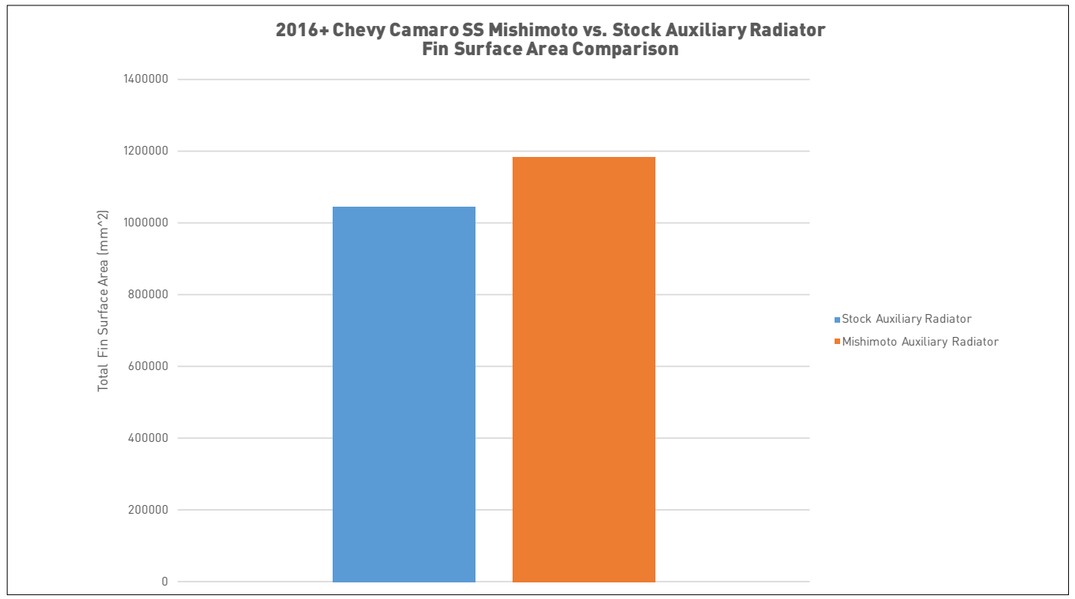

FIGURE 2: *The Mishimoto auxiliary radiator features an increase in fin surface area, which promotes greater heat transfer.*

PERFORMANCE TESTING

The Camaro was tested in our R&D facility where the ambient temperature was approximately 82°F (26.7°C) with 65% humidity. The auxiliary radiators were bench tested for efficiency, since isolating the effects of only these heat exchangers would be difficult when installed on the vehicle. Two different styles of the auxiliary rad were tested: a direct-fit design and a thicker option that would require the addition of brackets and shrouding. Both designs along with the stock cooler were tested by pumping hot water through each core and measuring inlet and outlet temperatures. The stock shrouding was attached to each core, and the fan was placed at an angle that would best replicate the angle of the front bumper opening relative to the shrouding. Once steady-state inlet temperatures were reached, each core was tested for approximately 5 minutes. The results can be seen in Figure 3 below.

As seen in Figure 3, both Mishimoto cores outperformed the stock core, with the larger core number two slightly outperforming core number one. Even so, the first core was chosen because the second core would require a significant increase in cost for additional brackets and shrouding. The chosen core showed a maximum temperature reduction of 8°F when compared to stock. This is an average efficiency increase of 10%, which will help reduce coolant temperatures when running the Camaro on a track or road during a hot day.

Steve Wiley
Product Engineer, Mishimoto Automotive

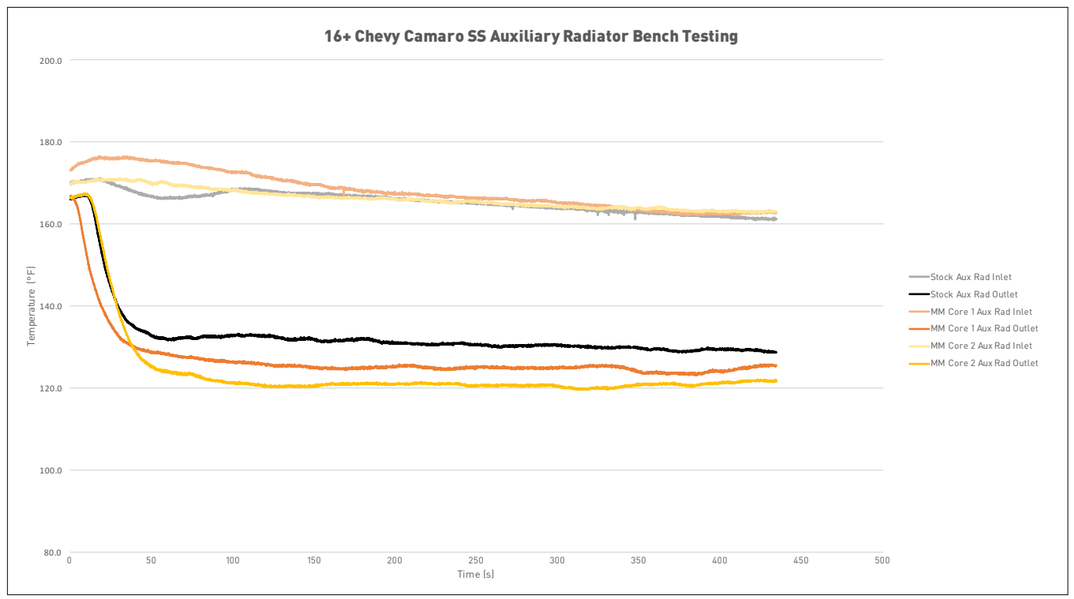

FIGURE 3: *The stock radiator and both Mishimoto radiators were tested using identical inlet temperatures. Both Mishimoto cores showed an increase in heat transfer when compared to stock.*

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