



MISHIMOTO



ENGINEERING REPORT

2014+ Chevrolet Corvette C7 Performance Aluminum Radiator | SKU: MMRAD-C7-14

By Jason Wettig, *Mishimoto Product Engineer*

REPORT AT A GLANCE

- **Goal:** Create a radiator that outperforms the stock unit. The Mishimoto cooler should fit directly into the Corvette without any cutting or modification required.
- **Results:** The Mishimoto radiator showed lower global engine temperature of up to 3–5°F when compared to the stock radiator. The increased fin surface area promotes greater heat transfer and takes advantage of the limited airflow in the front of the C7.
- **Conclusion:** The Mishimoto radiator is a valuable upgrade for Corvette owners who drive their vehicles on tracks or in hot climates. The upgraded heat exchanger helps to ensure 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 a radiator package that reduces coolant temperatures when compared with the stock configuration
- Must be a direct fit, with no cutting or permanent modification necessary

DESIGN AND FITMENT

The R&D process began by evaluating the stock system and understanding how the Corvette team chose to package the radiator. We needed to understand the layout and available space before the core could be increased in size. There was a fair amount of room behind the stock fan shroud. Using what we learned from

the C6 radiator, we were able to make a 2” thick core. GM placed the stock core on an angle to allow for a slight increase in surface area and to maximize the size in such a low car. Given these cars overheat, we placed a smaller tube height, fin height, and tighter fin pitch into this package. This will allow for better heat transfer.

The Mishimoto Corvette C7 radiator increases fluid capacity by 37.14% when compared to the stock C7 Stingray radiator. The radiator is thicker and has more rows, therefore it can hold more fluid. Figure 2 shows the fluid capacity comparison between the stock and Mishimoto radiators.



FIGURE 1: The Corvette C7 radiator mounted in the car

2015 Corvette Z06, Fluid Volume Comparison

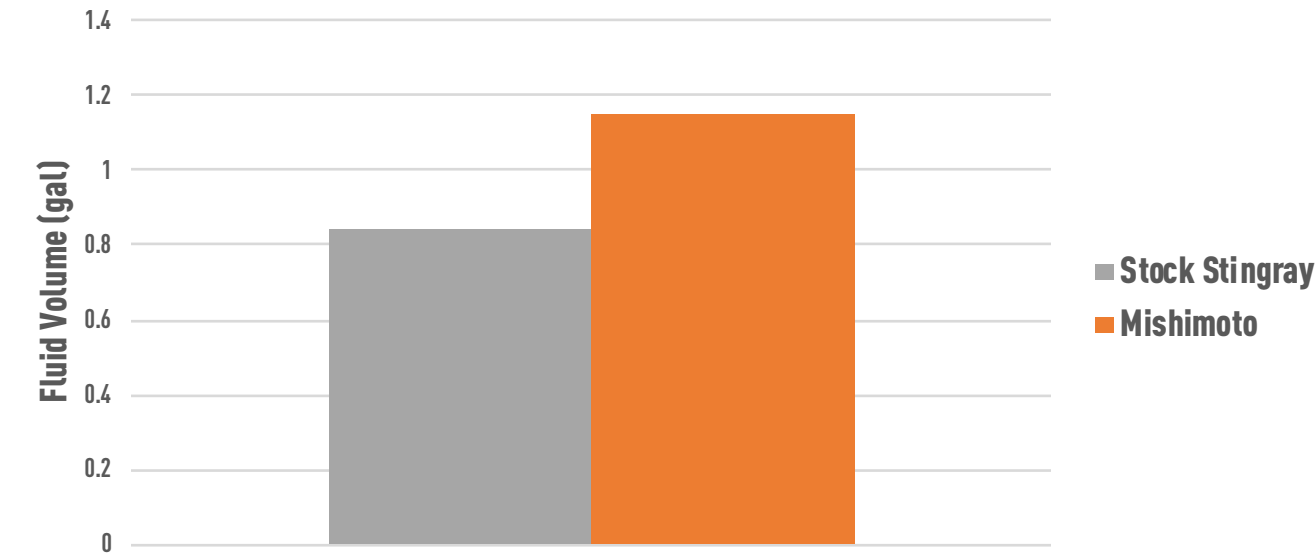


FIGURE 2: The Mishimoto radiator features an increase in coolant capacity, which promotes greater heat transfer

The Mishimoto Corvette C7 radiator also increases fin surface area by 135% when compared to the stock C7 Stingray radiator and 7.87% when compared to the Z06 radiator. With the thicker

core and more rows, a larger amount of fin surface area can be created. Figure 3 displays this difference between the stock and Mishimoto radiators.

2015 Corvette Z06, Fin Surface Area Comparison

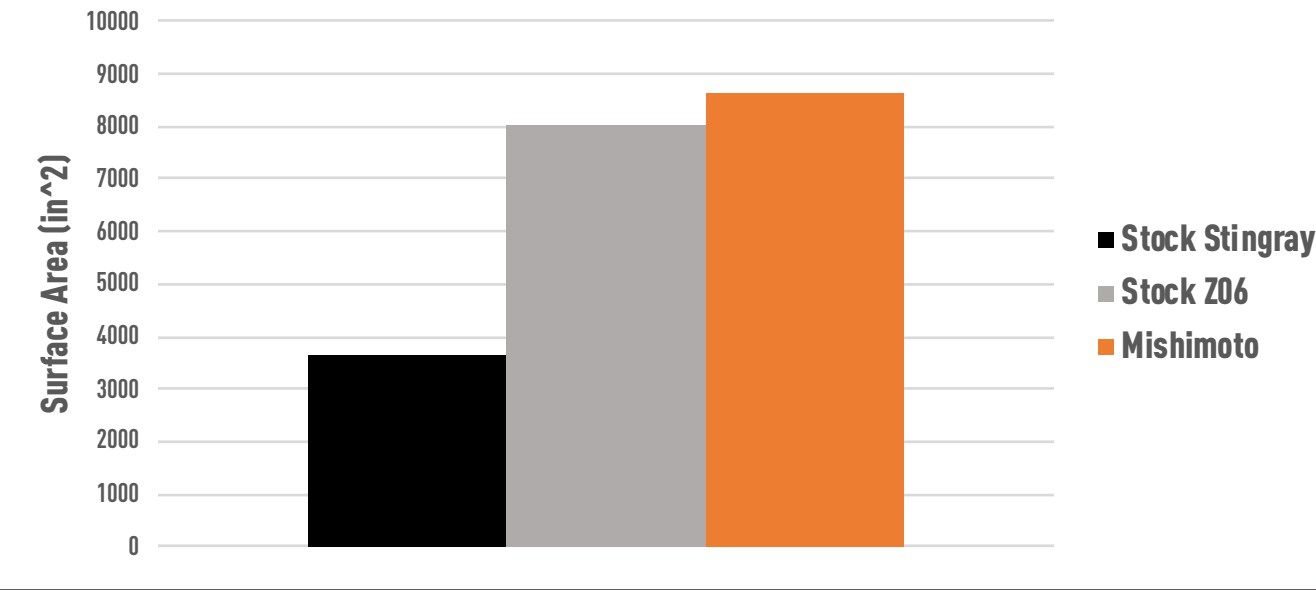


FIGURE 3: The Mishimoto radiator features an increase in Fin Surface Area, which promotes greater heat transfer

Core volume has also been increased by 119% over the stock Stingray and 38% over the stock Z06 radiator. Again, the increase in core size was directly responsible for this increase. Figure 4 shows the increase in core volume.

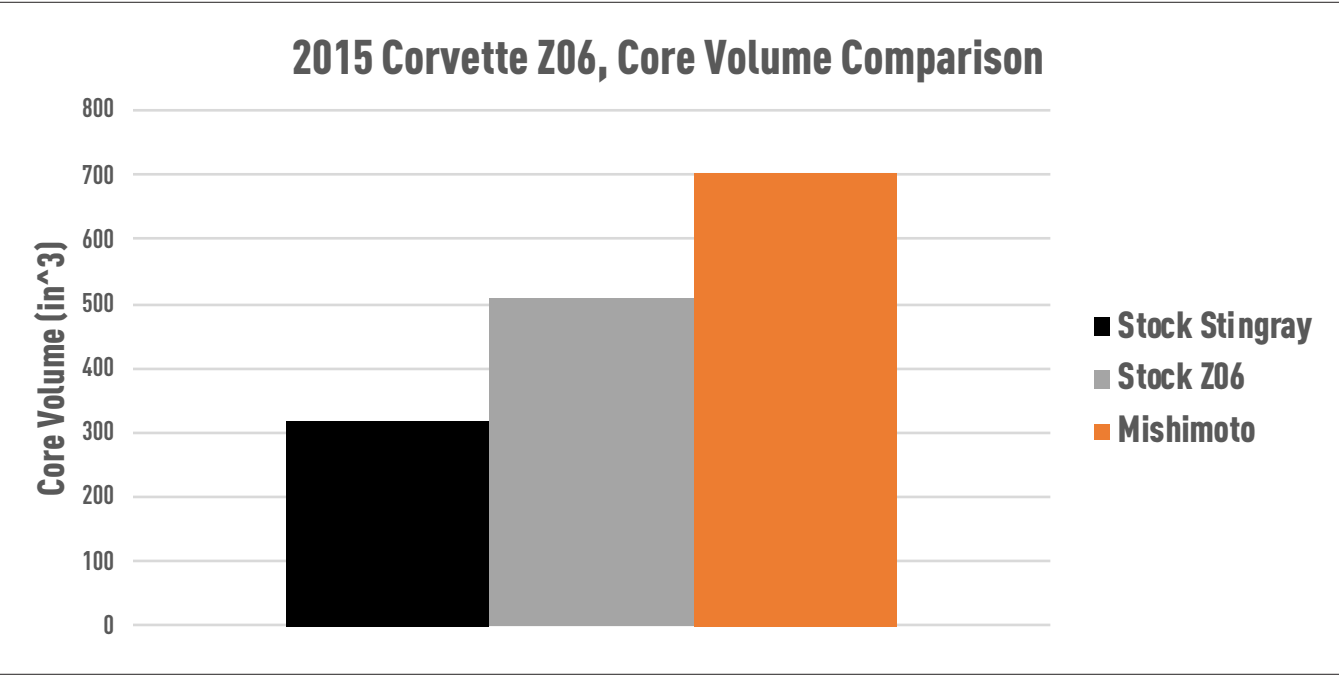


FIGURE 4: The Mishimoto radiator features an increase in core volume, which promotes greater heat transfer

PERFORMANCE TESTING

The C7 Z06 was hooked up to our dyno packs and placed under heavy load with thermocouples placed in the inlet and outlet hose on the radiator. Two tests were performed on the C7. The first test was a steady state test. The car was warmed up and then run under heavy load at 4000 RPM in 5th gear. This simulated heavy long-term driving. The second test was designed to simulate running the car on a race track. To generate sufficient heat and allow the water pump to run at different engine speeds, four consecutive

dyno pulls were made. This allows the engine to run at different speeds and is repeatable enough to compare data. The ambient temperature was approximately 70°F (21.1°C) with 42% humidity. There is an initial dip on the outlet of each run at the beginning of the graphs. This is due to the thermostat opening. An AEM datalogger was used to record all results, which can be seen below in Figure 5 and Figure 6:

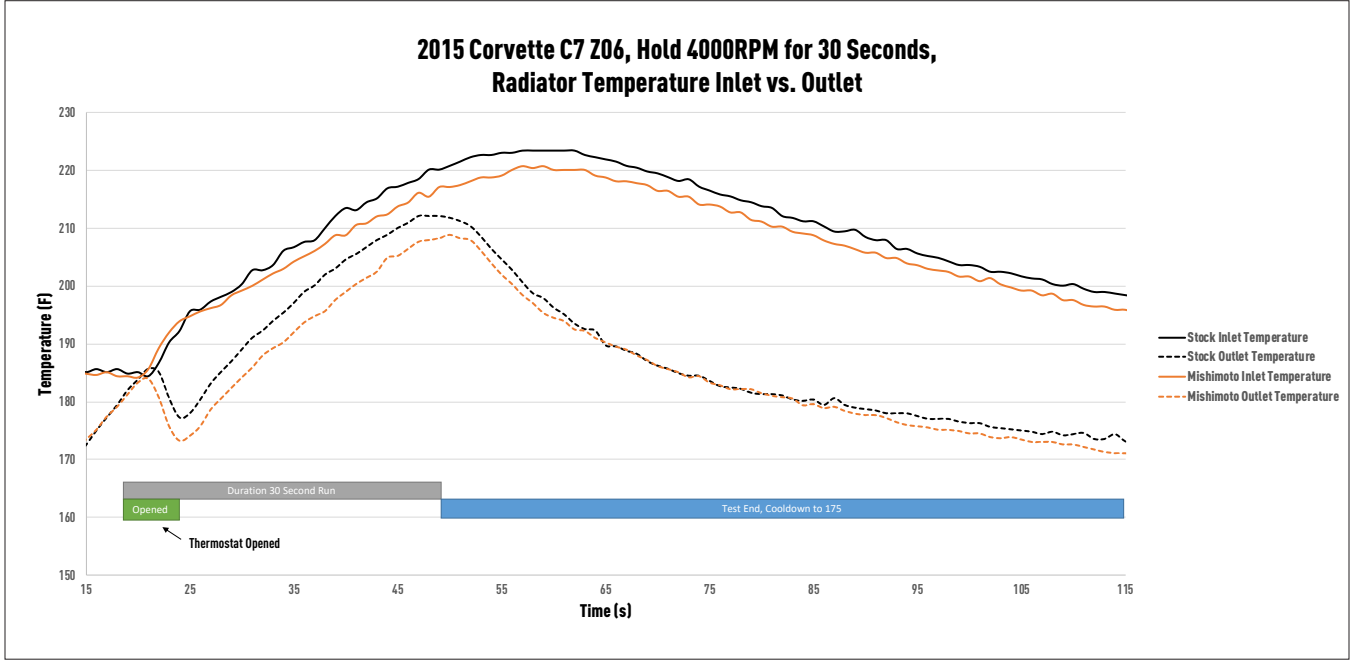


FIGURE 5: The Mishimoto radiator kept the global coolant temperatures cooler over the entire run (3-5°F) and had a greater temperature drop from inlet to outlet

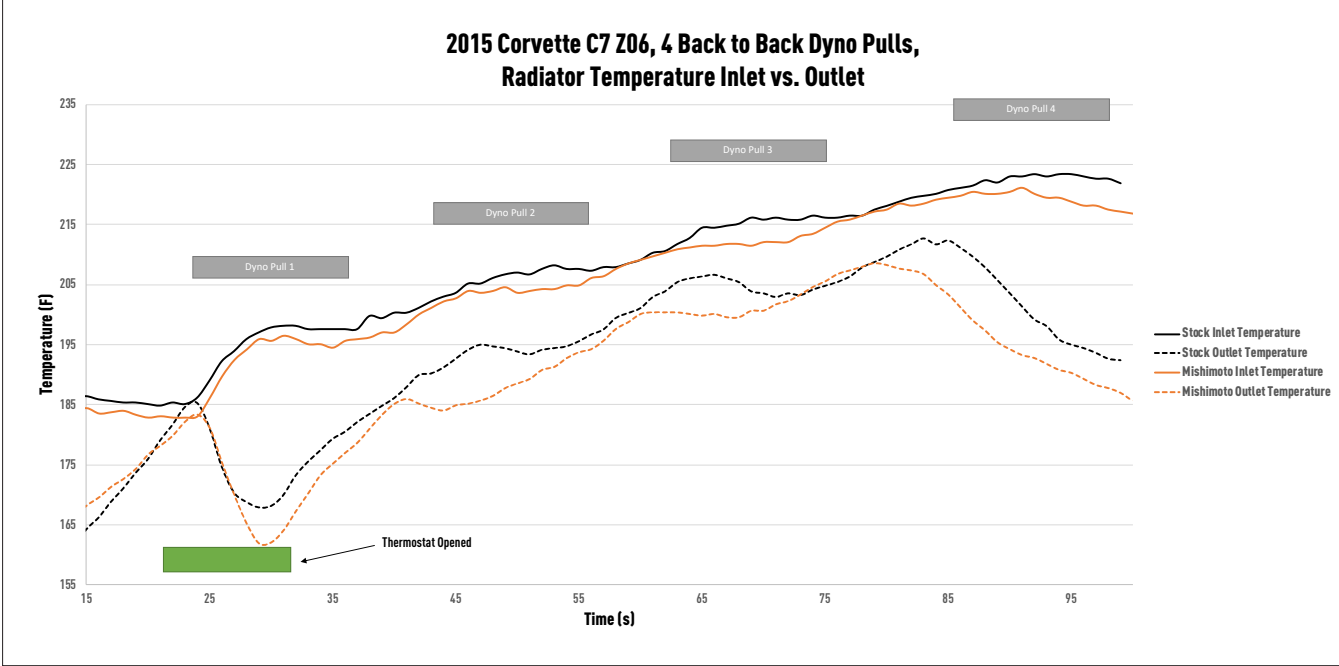


FIGURE 6: *The Mishimoto radiator kept the global coolant temperatures cooler over the entire run. This was done by creating a larger temperature delta across the radiator*

The Mishimoto performance intake lends a loud and deep intake. As seen in Figure 5 and Figure 6, the Mishimoto core outperformed the stock core by lowering engine temperatures by 3-5°F. The new Mishimoto Performance Radiator for the C7 Corvette was designed to decrease coolant temperatures without taking up too much precious space in the engine bay. This radiator lowers coolant temperatures, has increased fluid

capacity, and features a more durable all-aluminum construction. All these features will help your C7 Corvette perform better when driving in hot weather or under track conditions.

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