MISHIMOTO

ENGINEERING REPORT

Fiesta ST Oil Cooler Kit, 2014+ | SKU: MMOC-FIST-14

By Steve Wiley, *Mishimoto Product Engineer*

REPORT AT A GLANCE

- **Goal:** The Mishimoto oil cooler kit for the 2014+ Fiesta ST must cool better than stock and be direct fit with no cutting or modifications.

- **Results:** Once brackets and lines were created the cooler was tested on the road and reduced oil temperatures by an average of 35 °F while keeping pressure drop within an acceptable range. The cooler bolts directly in front of the Fiesta's grill opening for maximum cooling.

- **Conclusion:** It is a necessary addition for any Fiesta ST owner looking to track their car and keep oil from overheating.

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OBJECTIVES

To make an oil cooler that bolts directly onto the 2014+ Fiesta ST without any permanent modification to the vehicle. The cooler must be robust enough for the track but still safe for street conditions.

TESTING CONDITIONS

Testing took place on a relatively hot day with temperatures ranging from 83° to 85 °F (28° to 29 °C).

APPARATUS

For hardware Mishimoto chose AEM AQ-1 data logger sensors. The AQ-1 is able to log data at a rate of up to 1,000 samples per second while displaying real-time values on a computer screen.

FIGURE 1: *AEM AQ-1 data logger used for testing*

Oil temperatures and pressures were measured using AEM sensors that were mounted before and after the oil cooler. The data were then analyzed using the AEMdata software as seen in Figure 2 on bottom on page

RESEARCH AND DEVELOPMENT

The front end of the Fiesta ST contains the radiator, AC condenser, intercooler, and active grille shutters. These components leave very little room for improved cooling let alone a supplemental oil cooler.

Since reducing the size of any of the current heat exchangers wasn't an option, the active grille shutters were removed to accommodate the new oil cooler.

The Mishimoto oil cooler was mounted above the crash beam and behind the front bumper grille openings for the best airflow.

Previous oil cooler testing has shown that the mounting location for the oil cooler is very important when trying to achieve the most efficiency. Figure 3 on next page shows the final chosen location of the oil cooler. More information on the R&D process can be found on the Mishimoto Engineering Blog here: http://engineering.mishimoto.com/category/ford-fiesta-st-oil-cooler-kit-2014/

FIGURE 2: *AEMdata software graphs the data collected during testing to show important results such as overall temperature drop.*

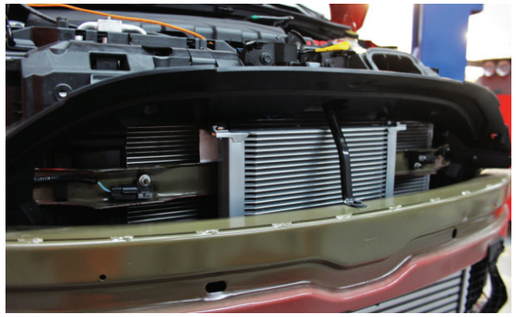

FIGURE 3: *The oil cooler was mounted above the crash beam and directly behind a front grille opening for optimal airflow.*

EXPERIMENT

The Fiesta comes equipped with an oil cooler from the factory that serves two primary functions: to quickly warm the oil in cold ambient temperatures, and to keep the oil temperatures cool in hot conditions. The stock unit works well for normal driving conditions but falls short in performance when the car is driven aggressively.

To determine the effects of the stock oil cooler, three separate tests were performed:

1. Oil temperatures and pressure were measured on a completely stock car.
2. Temperatures and pressures were measured with both the stock oil cooler and Mishimoto oil cooler installed together.
3. Temperatures and pressures were measured with the stock oil cooler removed and the Mishimoto oil cooler installed.

All three setups were tested until they reached steady-state conditions. To conduct each test we first let the car idle until it became heat-soaked. Next, we drove the Fiesta on a highway at approximately 65 mph and cruised for approximately 10 minutes. Special attention was given to the space between the Fiesta and the car in front of it to ensure that fresh air was flowing into the oil cooler. This experiment is 100% repeatable when the test is conducted under similar weather and road conditions. The results are shown in Figure 4 below.

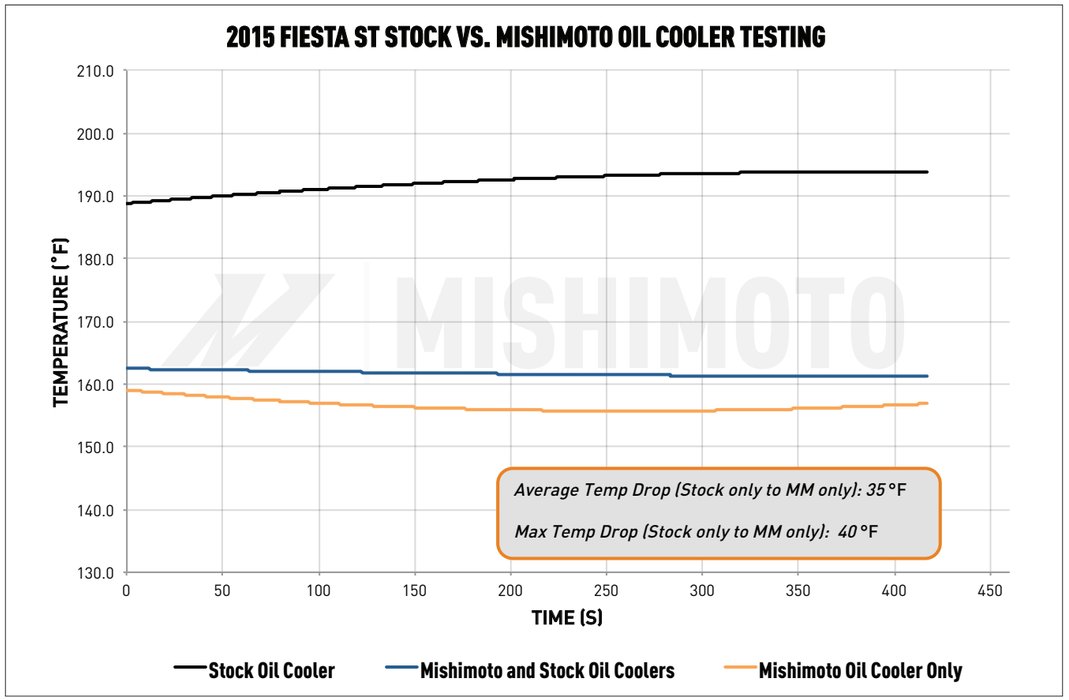

FIGURE 4: *The Mishimoto oil cooler dropped temperatures to 35˚F below the stock setup with the stock cooler still installed. Once the stock oil cooler was removed the oil temp dropped an average of 40˚F.*

SUMMARY

The testing results show that the Mishimoto oil cooler will work well to keep Fiesta ST oil temperatures in check during a track day or other hard driving conditions. When compared to the stock setup, the Mishimoto oil cooler reduced temperatures by an average of 40 °F (with the stock oil cooler removed). The direct-fit brackets and lines allow the Mishimoto oil cooler to be installed without any cutting or permanent modification to the vehicle. The Mishimoto direct-fit oil cooler is a necessary addition for any Fiesta ST owner who is looking to preserve engine longevity during hard driving conditions.

TESTING DONE BY

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