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**MISHIMOTO ENGINEERING REPORT**

**Testing of the Subaru Impreza STI Direct-Fit Oil Cooler**

**Test Vehicle**  
2010 Subaru STI

**Objective**  
To make an oil cooler kit that directly bolts onto the 2008-2014 STI and that is robust enough for the track but still safe for street conditions.

**Testing conditions**  
Testing took place on a mild day. Temperature range: 80-85°F.

**Apparatus**  
For hardware Mishimoto chose the PLX sensor modules driven by the Kiwi WiFi plus iMFD. This is a wireless system from the sensor modules to an iPad or laptop computer. The software used was the Palmer Performance Scan XL pro, which has full data logging capabilities.

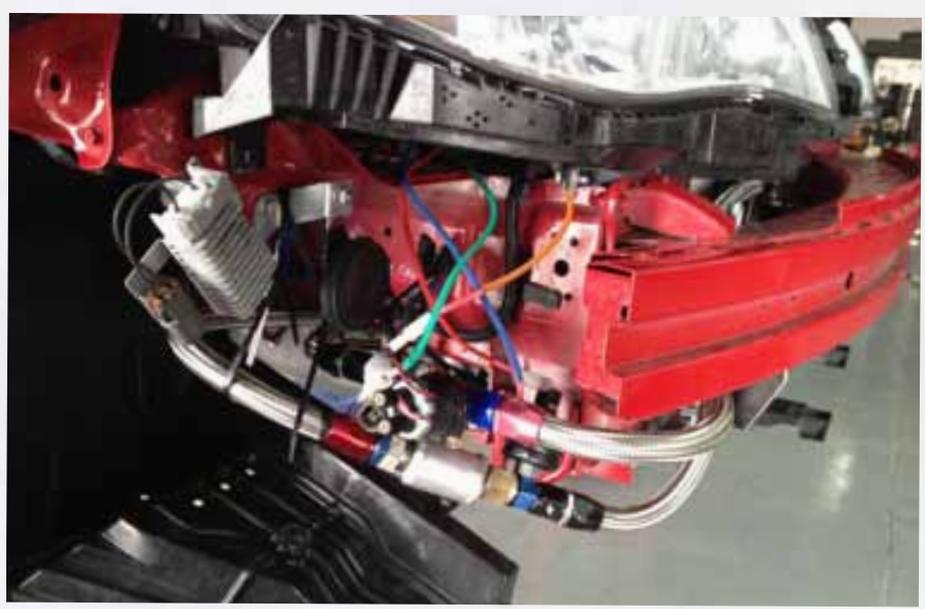


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Fluid temperatures were taken from both the inlet and outlet of the 19-row oil cooler using a Mishimoto oil sandwich plate with PLX fluid temperature sensors. Oil pressure was also measured to ensure that no dramatic pressure drop occurs when installing the oil cooler.



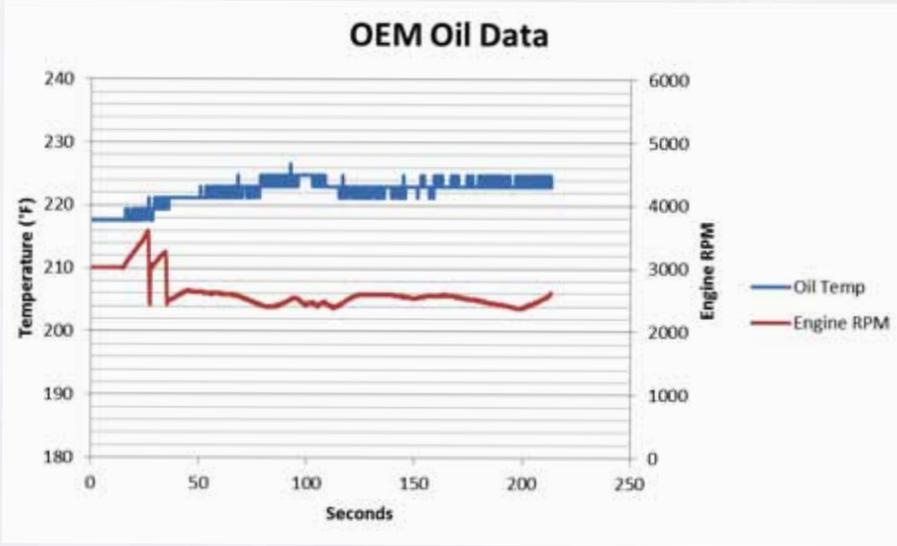
A thermocouple was mounted in the front grille with no obstructions so that ambient air temperatures could be measured.

## **Experiment**

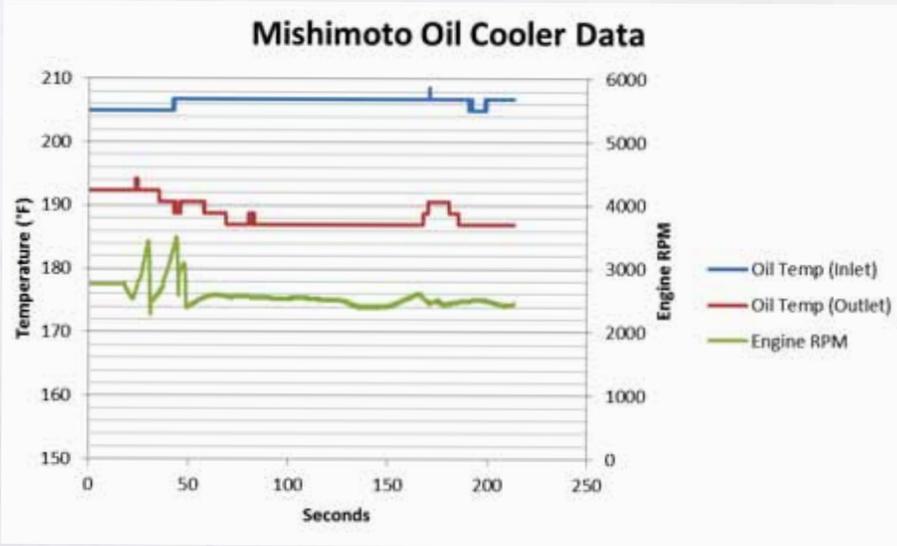
The test compares the OEM oil temperatures versus the Mishimoto 19-row direct-fit oil cooler. Both setups were tested until they reached steady-state conditions. To conduct the test we first let the car idle until it became heat soaked. Next, we drove the STI on a highway at approximately 65 mph and cruised for approximately five miles. Special attention was given to the space between the STI 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 conditions.

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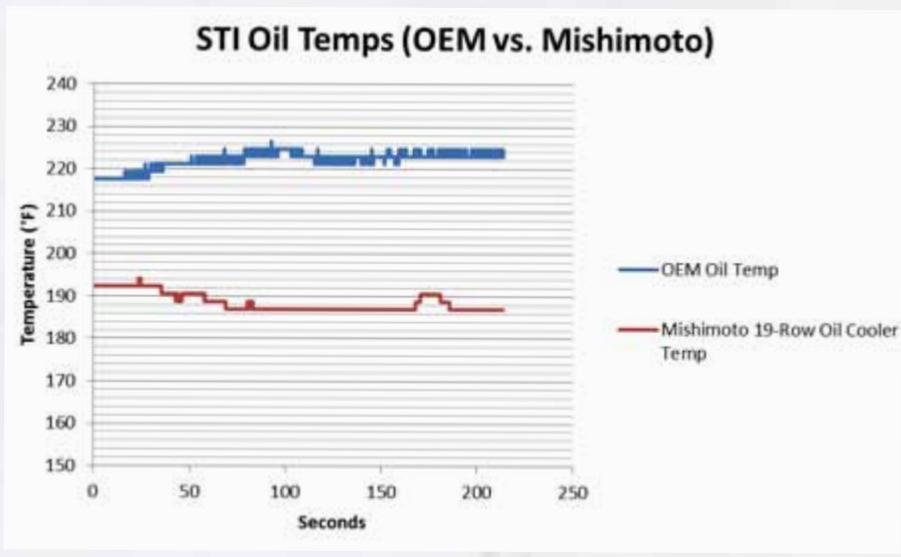
At cruising speeds, the OEM oil temperature is around 223 degrees F.





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At cruising speeds, the oil temperatures entering the cooler are around 207 degrees F. The graph above shows that, under cruising conditions, the Mishimoto oil cooler reduced temperatures by approximately 20 degrees on average with minimal pressure loss.



The graph above compares the temperatures of the oil returning to the engine with and without the oil cooler installed. A drop in temperature of roughly 36°F occurs when the STI is equipped with the Mishimoto 19-row oil cooler.

All of the testing data shown above was collected with the OEM oil warmer/cooler installed. This warmer/cooler is used to warm the engine oil to a safe running temperature when started in cold weather conditions. It is also used in hot weather conditions to cool the oil using the engine's coolant.



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**Summary**

The testing results show that the Mishimoto oil cooler works well to reduce temperatures while losing only a few psi of pressure. Under more harsh driving conditions the inlet temperatures to the cooler will increase, resulting in an even greater difference between inlet and outlet temperatures.

A handwritten signature in black ink, appearing to read "Dan Tafe", written over a horizontal line.

Dan Tafe  
Product Engineer, Mishimoto Automotive