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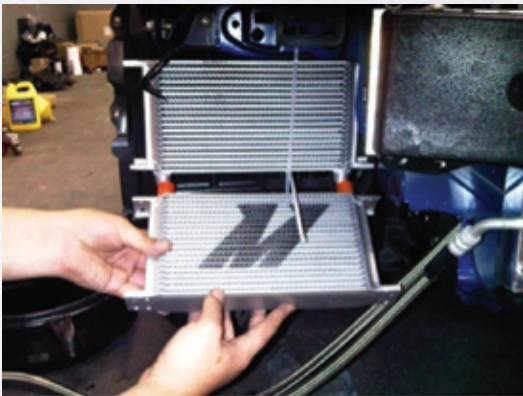
**MISHIMOTO TECHNICAL SPECS**

Subject: 08+ Mitsubishi Evolution X Oil Cooler Kit

**Stage One: Development**

**Building a prototype**

First step was to find a suitable place to mount two Mishimoto 19-row oil coolers. This was not an easy task because engineering was given the challenge to mount the entire kit without cutting anything, including the bumper, and also to retain the factory fog lights. The engineers wanted to mount the coolers using the setup shown below. Although the setup looks cool and would receive a good amount of airflow, there was no way for the bumper to fit on the car with this orientation.



08+ Mitsubishi Evolution X Oil Cooler Kit

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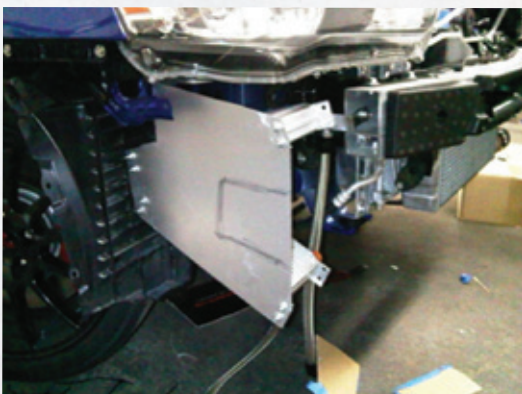
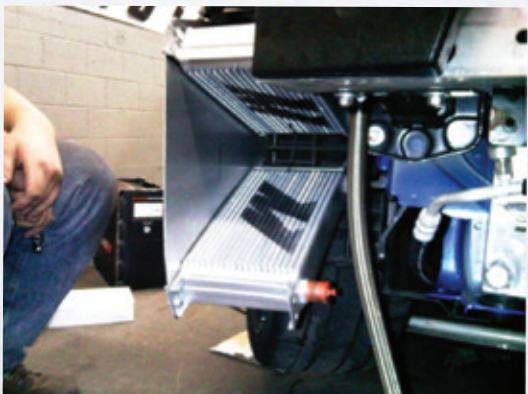
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The next orientation chosen is shown below. In this configuration we were able to fit both coolers without cutting the bumper, or removing the fog light, and still get great airflow to both coolers.



After orientation is determined, engineers can begin making the ducting to control proper airflow.

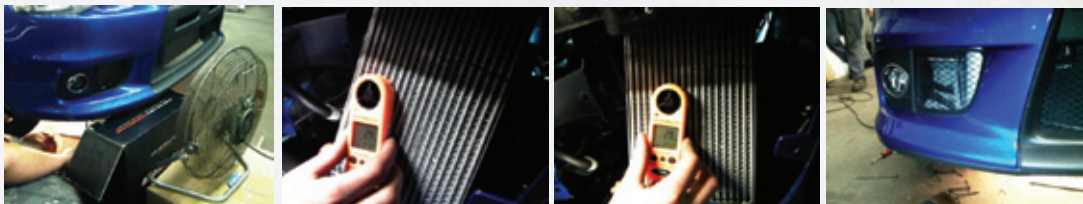


After all ducting is adjusted to fit with the bumper; engineers are ready to start airflow testing through the two oil coolers.



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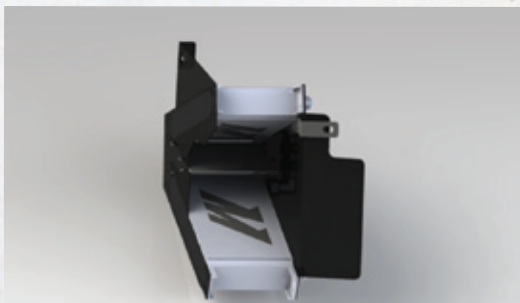
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Mishimoto engineers then created an air diverter that mounts between the two coolers and is designed to channel air through the cores of the oil coolers. By adding this simple part, the air velocity passing through the coolers was doubled. A second more aggressive diverter was then designed with a longer splitter and three smaller additional diverters coming off the splitter. The engineers thought this would help distribute the air even better than the first diverter, but after testing the unit they found that both diverters performed the same. Because there was no difference in performance and the first diverter was of a simpler design, engineers choose the first design for mass production.

## Stage Two: CAD Design

First, the engineers used the coordinate measuring machine (CMM) arm to collect data points from the prototype sample that was built on the car. After critical points are recorded in three-dimensional (3-D) space, the engineer can begin to create a model of the final product. The final result is shown below.





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Next, Mishimoto engineers designed a special banjo fitting that would fit with the Evo X stock oil thermostat housing. Using information pulled from the actual car, engineers designed a fitting that will be CNC machined and will fit perfectly the first time. The CAD models are shown below.



After all the 3-D CAD models are created, a sample of the product can be produced for performance and durability testing. The production-quality model is shown below.



The next step is to install the unit on the car and ensure proper fitment. After perfect fitment is confirmed we can begin testing the product. Please continue to read on for test results.





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### Stage Three: Testing Data

#### Test Vehicle

2010 Mitsubishi Evolution X GSR

#### Installation Difficulty



#### Testing Conditions

Testing took place on a mild and dry day in February. Temperatures were in the 48-51 °F range.

#### Apparatus

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





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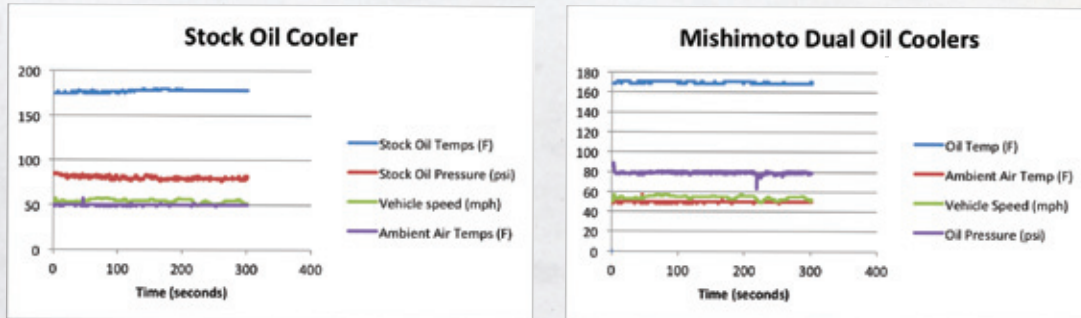


Fluid temperatures were taken from the oil filter location using a Mishimoto oil sandwich plate with PLX fluid temperature sensor. Oil pressure was also tested to ensure that no dramatic pressure drop occurs when installing the large oil coolers.

A thermocouple was used to measure ambient air temperature for the test. The location chosen was in the front grill with no obstructions.

## Experiment

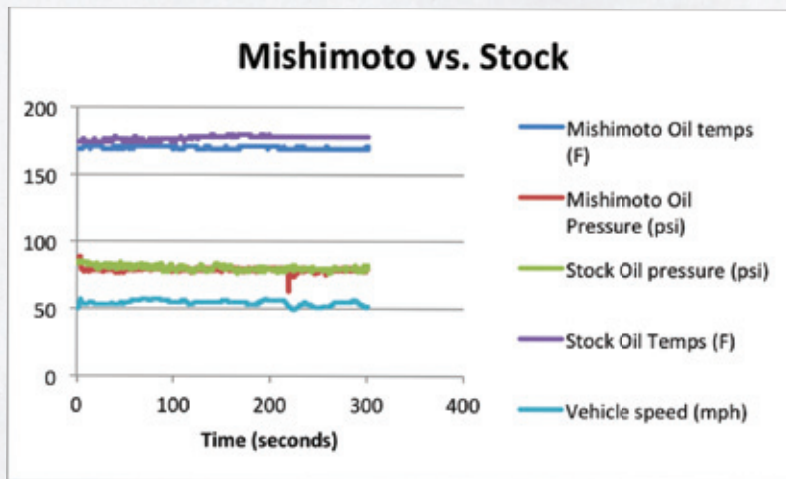
The test compares the stock oil temperature versus the dual Mishimoto 19-row direct-fit oil coolers. To conduct the test we drove the Mitsubishi on a highway at approximately 55mph (2850 rpm in 5th gear) and cruised for approximately five miles. Special attention was given to the space of the car in front of the Evo to ensure that fresh air was flowing into the oil coolers.





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Notice that the Mishimoto units cool to about 10°F lower than the stock unit and still retain factory oil pressure.

### Conclusion

This oil cooler kit is a 100% bolt-on kit that requires no modifications to the vehicle. Mishimoto was able to reduce oil temperatures on the stock Evo X by 10°F under highway driving condition. The Mishimoto kit was also limited to the stock oil thermostat operating temperature. From reviewing data logs Mishimoto engineers noticed that the Evo stock thermostat must be set right around 170°F. When the coolers start to cool the oil lower than 170°F, the thermostat blocks oil passage to the coolers for normal driving conditions. Under harsh driving or track use you can expect larger temperature drops after installing this kit.

### Engineer's Comments

This product not only looks great installed, but performs just as well. Because the stock car has an oil thermostat, I don't believe we uncovered the full potential of this oil cooler setup. I believe once you track test these coolers, you will really begin to see how much better this setup is over stock.

Kevin McCardle  
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