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MISHIMOTO ENGINEERING REPORT

Testing of the 2010-2012 Dodge 6.7L Cummins Mishimoto Intercooler

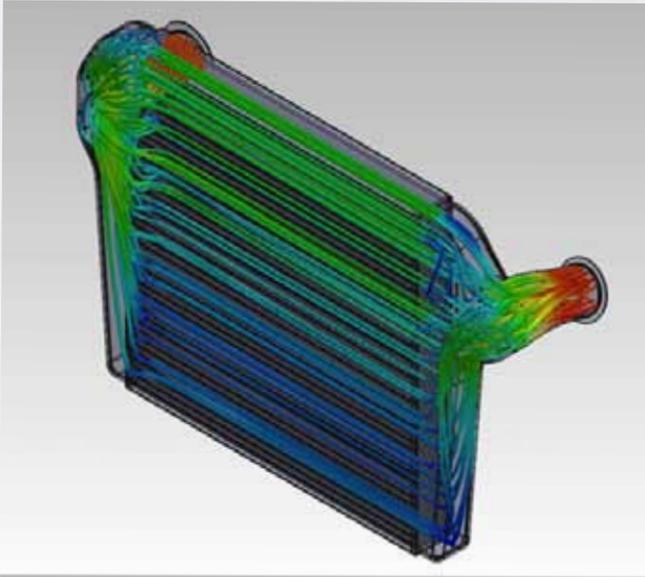


Figure 1: CFD testing of the Mishimoto Intercooler

Test Vehicle:

2010 Dodge RAM 2500 with 6-speed auto transmission

Test Vehicle Modifications:

Aftermarket air intake, aftermarket exhaust, tune

Testing conditions:

Outside temperatures range: 70°F-76°F

Apparatus:

For hardware Mishimoto chose 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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Air intake temperatures (AIT) were taken from the inlets and outlets of both intercoolers using PLX K-type thermocouples. Boost pressure was also tested to ensure that no dramatic pressure drop occurs when installing the larger Mishimoto intercooler.



Figure 4: Sensor locations for the inlet of the intercoolers

Sensor locations

1. Pre-intercooler air intake temperature
2. Pre-intercooler boost pressure
3. Post-intercooler boost pressure
4. Post-intercooler air intake temperature

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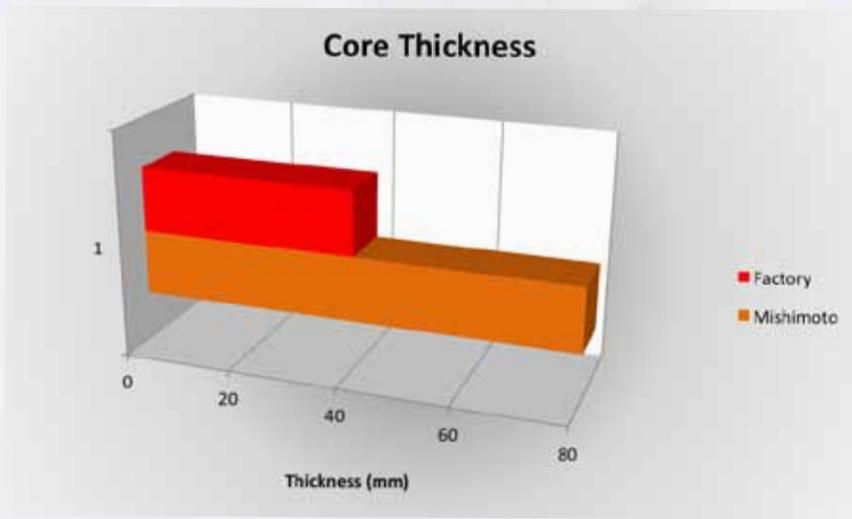


Figure 5: The Mishimoto intercooler thickness is 100% thicker than the factory intercooler.

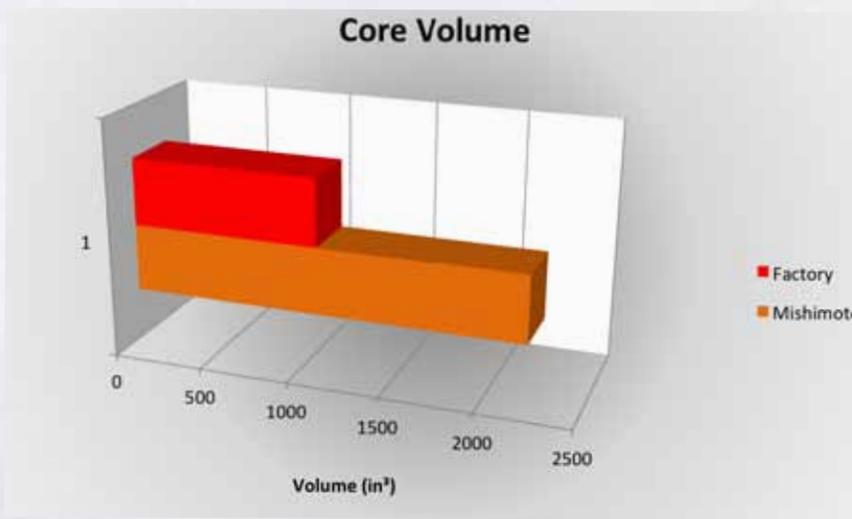


Figure 6: Mishimoto core volume is increased 52% over factory volume

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2010-2012 Dodge 6.7L Cummins
Mishimoto Intercooler

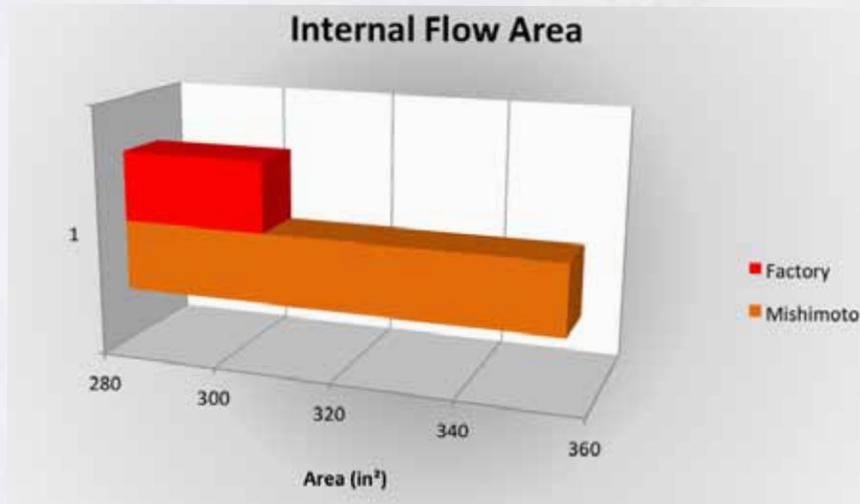


Figure 7: Mishimoto internal flow area is increased 14% over the factory intercooler

The engineering team went through multiple iterations while designing the end tanks using CFD software to make sure that the flow was just right for the Dodge 6.7L Cummins.

This intercooler is designed with a 100% thicker core than the factory intercooler, giving it a 52% increase in core volume and a 14% increase in internal flow area.

Experiment:

The test compares the stock intercooler with the Mishimoto intercooler under exactly the same conditions. To conduct the test we made three runs with each setup in 6th gear and ran the truck from 1800 rpm to 3200 rpm. Between runs, a 4-minute break was given to ensure that each run started with similar temperature conditions. Every test was conducted with the hood up, and a large fan was placed directly in front of the core. The truck was strapped down once, and the intercoolers were swapped out on the dynamometer so that both tests had exactly the same conditions.

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Figure 9 is a graph of the air temperatures that were recorded while testing the Mishimoto Intercooler. The Mishimoto intercooler was able to reduce the air temperature coming out of the intercooler to a nearly ambient temperature. The testing showed a 5% reduction in outlet temperatures with the Mishimoto intercooler compared to the factory intercooler.



Figure 8: Dynamometer testing of the Mishimoto Intercooler

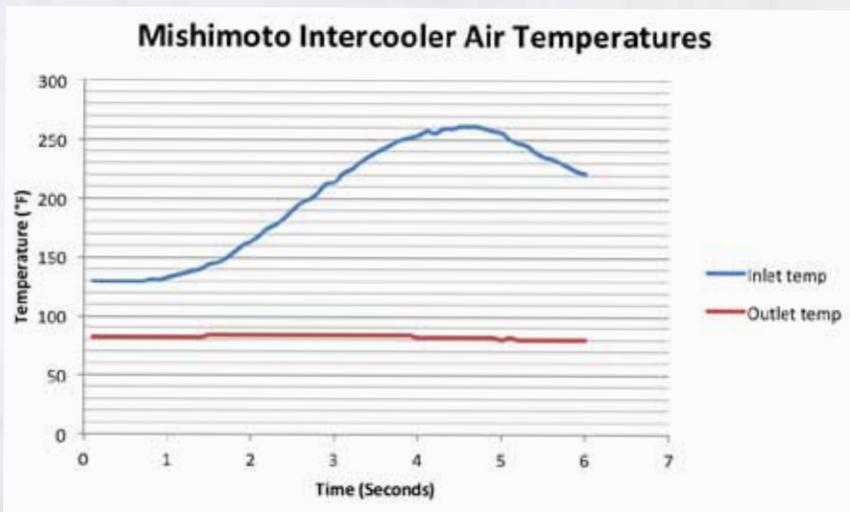


Figure 9: The Mishimoto intercooler reduced the outlet temperatures by an average of 5%.

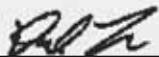
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Conclusion:

The dyno testing indicated that the factory intercooler is a good unit for normal everyday driving but we did notice a 5% decrease in outlet temperatures when we switched to the Mishimoto Intercooler. Also, for highly modified or upgraded turbo trucks, the Mishimoto unit features casted end tanks and a bar-and-plate core, which handles much higher boost levels than the tube-and-fin core of the factory unit.



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