

**TOP SECRET**

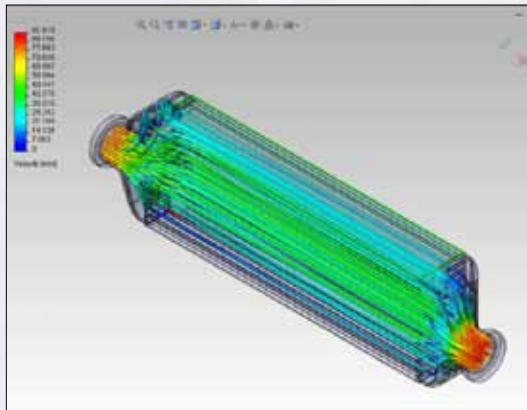
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RESEARCH & DEVELOPMENT

**INTRODUCING THE NEW MISHIMOTO J-LINE INTERCOOLER**

Subject: J-Line Universal Intercooler



Above is a CAD model



Above is an image of CFD analysis on the intercooler

The new Mishimoto J-Line Intercooler was designed specifically for mid- to high-horsepower Hyundai Genesis Coupes. It fits in the front grill with the factory crash beam and without the need for any modifications to the vehicle. The engineering team went through four iterations while designing the end tanks using CFD software to make sure that the flow was just right. They also tried out various internal fin types to ensure that this product would be the absolute best for the Genesis.

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## MISHIMOTO TECHNICAL SPECS

Subject: J-Line Universal Intercooler

### Mid-HP Test Vehicle

2010 Hyundai Genesis Coupe 2.0t

### Modifications

Cone style intake filter and ECU tune making 17psi

### Objective

To make a racing intercooler kit that bolts directly to the 2010+ Hyundai Genesis Coupe without modification and that also supports high-horsepower builds.

### Apparatus

For hardware Mishimoto chose the PLX sensor modules driven by the Kiwi WiFi +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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Intake air temperatures were taken from both the inlet and outlet of intercoolers using PLX K-type thermocouples. Boost pressure was also tested to ensure that no dramatic pressure drop occurs due to the larger Mishimoto intercooler.



## Testing Conditions for Mid-HP Vehicle

Testing took place on a dry, mild day. Temperature range: 66-70°F

## Experiment

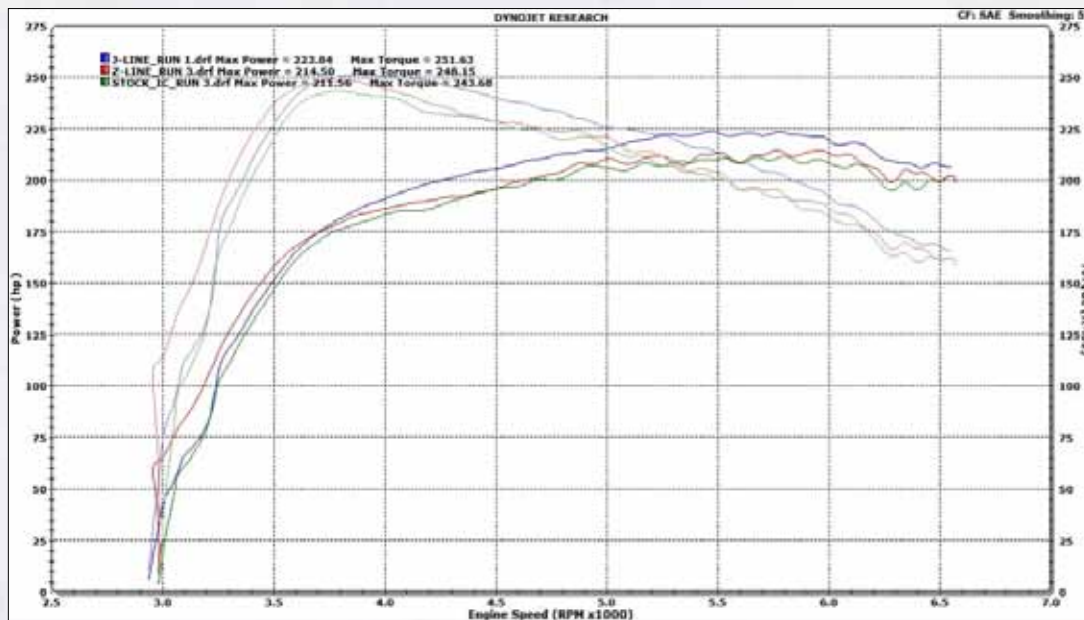
The test compares the stock front-mount intercooler (FMIC) with the base Mishimoto FMIC kit (MMINT-GEN4-10) that utilizes the Mishimoto Z-Line intercooler. Also compared is the newly designed Mishimoto FMIC race kit (MMINT-GEN4-10R) that utilizes the new Mishimoto J-Line intercooler. The engineers tested all three setups under the same conditions. To conduct

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the test we made three runs with each setup, taking 5-minute intervals between runs to ensure that each run started with similar temperature conditions. Every test was conducted with the hood up and a blower fan placed directly in front of the FMIC core. Wind speed out of the blower was 60 mph, hitting the intercooler core at approximately 15 mph. The Genesis was strapped down once, and the intercoolers were swapped on the dynamometer so that all three tests had exactly the same conditions.

## Results

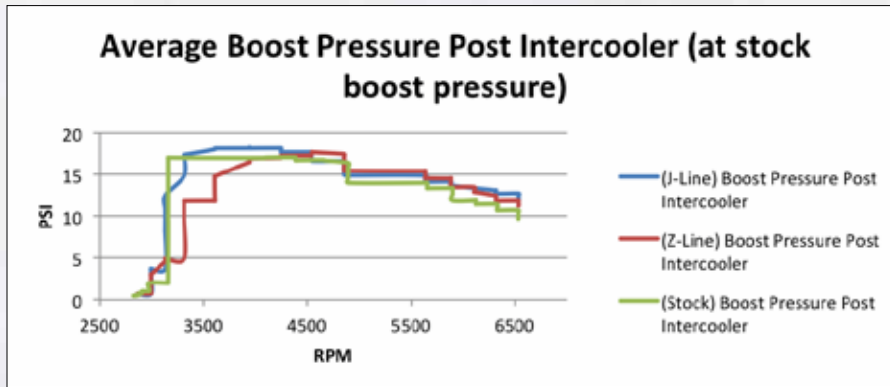


The graph above shows that the MMINT-GEN4-10 base kit (in red) gained 3whp and 4.5wtq over the stock intercooler setup (in green). The MMINT-GEN4-10R race kit (in blue) performed even better, gaining 12whp and 8wtq over the stock setup.



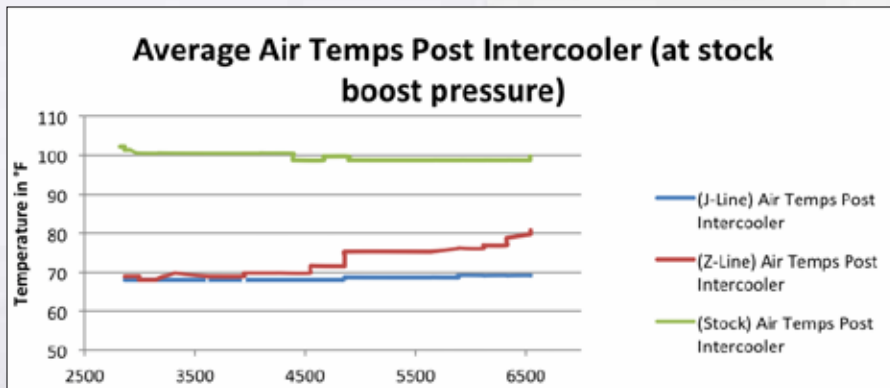
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### Pressure Differences



The graph above shows the boost pressure after the air has gone through the intercooler. Both Mishimoto units gained almost a full pound of pressure over the stock unit. This improvement is due to the flow patterns that were carefully engineered by Mishimoto using CFD software.

### AIT Differences



The graph above is comparing the average air intake temperatures after the air has passed through the intercooler. The MMINT-GEN4-10 (Z-Line) unit cooled the air about 23°F better than the stock unit, and the MMINT-GEN4-10R (J-Line) cooled the air about 28°F better than



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the stock. The reduction in temperature is credited to the increased core thickness of both Mishimoto intercoolers, which have more fins for the air to transfer heat. Also, both kits utilized the Mishimoto FMIC polished aluminum piping kit, which allows for increased air flow.

### **The Quest to Find a High-HP Genesis**

The engineering team was pleased with the results from the mid-HP Genesis testing but would not be completely satisfied until the race intercooler kit was tested and proven to work on a high-HP build. Locating a high-HP Genesis was proving to be difficult until we heard from our friends at Jotech Motorsports in Garland, Texas. Jotech Motorsports had just recently completed a Genesis build that now holds the current world record for highest horsepower at 587whp, but due to street-able driving issues, they swapped out for a smaller turbo and brought the power down to the high 300's. What better vehicle to use as a test subject! So we packed up the PLX testing equipment and headed down to Texas.

### **High-HP Test Vehicle**

2010 Hyundai Genesis Coupe 2.0t

### **Modifications**

Buschur SR Intake	Greddy Profec B Boost Controller
Synapse Turbo Manifold	1000cc Injectors
ATP Drop-In Turbo GT76R	Fuel Pump Upgrade   ATP Return Kit
MXP Turbo-back Exhaust	NGK Iridium Colder Spark Plugs
Clutchmaster Stage 4 Clutch kit   Flywheel	HKS Grounding Kit
Cusco 1.5 LSD	Jotech Built Shortblock: Manley Pistons, Manley Rods
Tial Blow-off Valve	
Dynojet CMD w/PowerAxel reflashed	

### **Testing Conditions for High-HP Vehicle**

Testing took place on a dry, hot day. Temperature range: 95-102°F

### **Experiment**

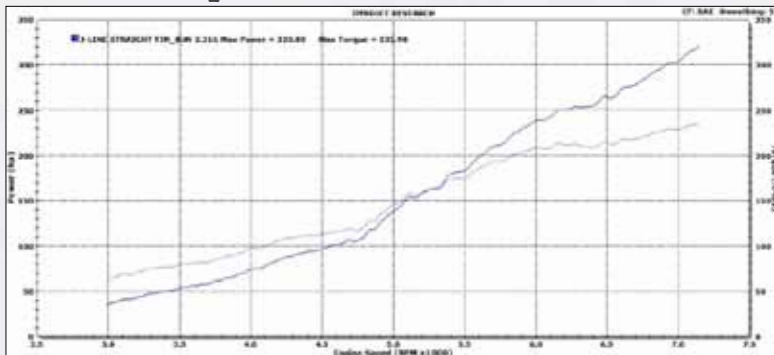
Test the newly designed Mishimoto FMIC race kit (MMINT-GEN4-10R) on a high-HP car and monitor its performance. We conducted the tests at 17psi, 20psi and 25psi. For the testing at 25psi we decided to kick it up a notch and run the car on 105 octane race fuel. To conduct the test we made three runs at each boost setting, taking 5-minute intervals



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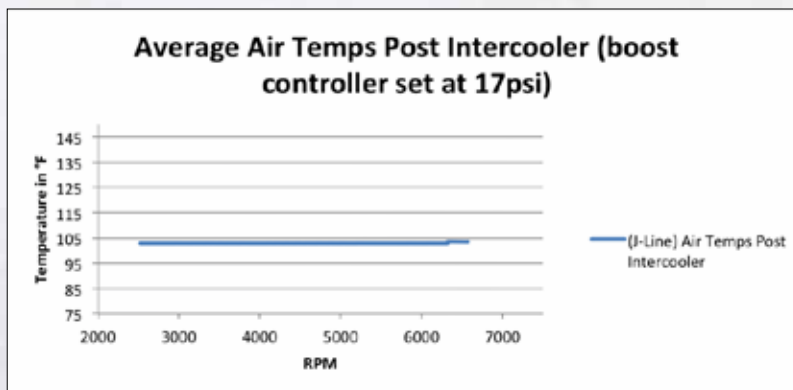
in between runs to ensure that each run started with similar temperature conditions. Every test was conducted with the hood up and a blower fan placed directly in front of the FMIC core. Wind speed out of the blower was 60 mph, hitting the intercooler core at approximately 15 mph.

### Results at 17psi



The graph above shows that the J-Line core has the proper cooling capacity to keep up with high HP builds.

### AIT Differences



The graph above shows that the J-Line's outlet air temperature was almost reaching ambient temp.

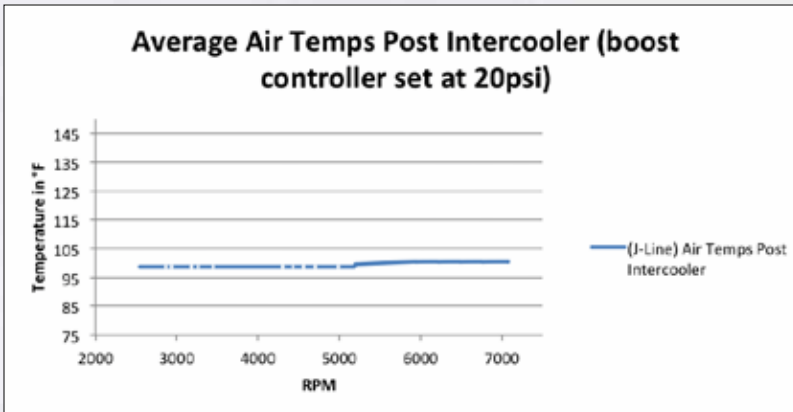


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### Results at 20psi



### AIT Differences

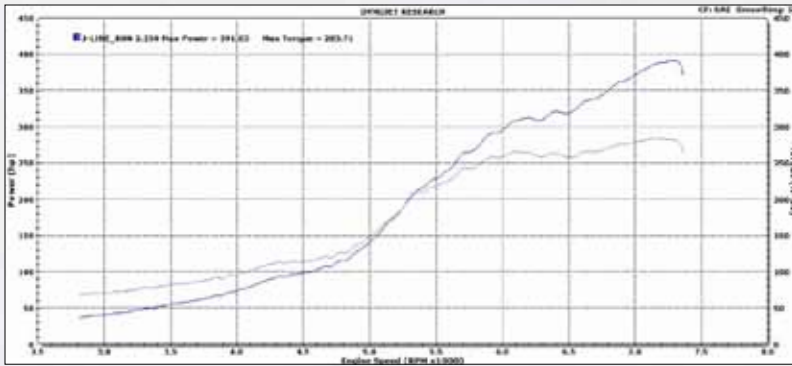


The graph above shows that the J-Line's outlet air temperature was still reaching near ambient temp, though it did rise slightly due to the added boost pressure.

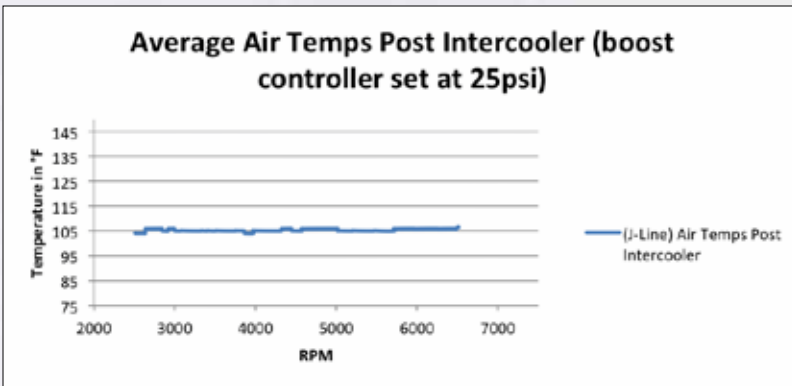




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### Results at 25psi



### AIT Differences

The graph above shows that the J-Line's outlet air temperature was still reaching near ambient temps despite the added heat and stress the car was enduring due to the higher boost pressure.



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**Summary**

The testing results show that the new Mishimoto J-Line intercooler used in the MMINT-GEN4-10R race kit was able to improve horsepower, torque and pressure loss and also lower AIT over the stock unit.

**Conclusion**

Mishimoto's new J-Line FMIC is capable of supporting high-HP vehicles.

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

Dan Tafe  
Product Engineer, Mishimoto Automotive