

TOP SECRET

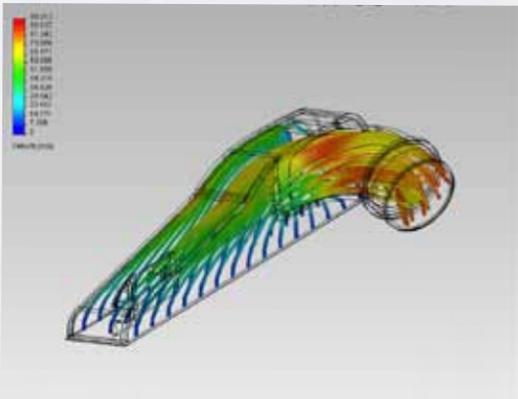
MISHIMOTO
RESEARCH & DEVELOPMENT

MISHIMOTO ENGINEERING REPORT

Subject: 2006-2010 Chevrolet/GMC 6.6L Duramax Mishimoto Intercooler and Piping Kit

Mishimoto Disclaimer

We at Mishimoto would like to thank you for taking the time to read our Engineering Report. We know that many readers have questions regarding the efficiency of diesel truck intercoolers. Many companies make broad claims but fail to substantiate them with proven testing data. Each Mishimoto product has been tested in-house on our Dynojet 424LX dynamometer. Testing results were obtained using PLX K-type thermocouples and analog pressure gauges (0-100 psi range). The sensors were kept in the same location, from factory intercooler testing to Mishimoto intercooler testing, to ensure consistency in data collection. This controlled experiment allowed us to isolate the intercooler, so that we could determine the performance of the product alone. No variables such as intakes, exhausts, or tunes were changed or modified during testing. Performance results will vary from vehicle to vehicle depending on modifications.

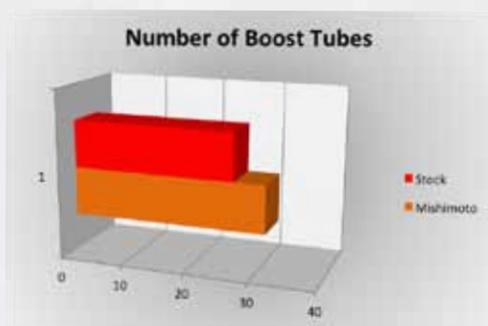
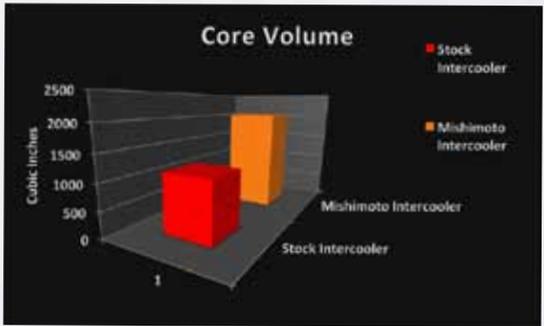


The engineering team went through multiple iterations while designing the end tanks using CFD software to make sure that the flow was optimal for the Chevrolet/GMC 6.6L Duramax. The core of the Mishimoto unit is 43% thicker and 55% larger in volume than the stock unit. The Mishimoto intercooler has casted end tanks and a bar-and-plate core, versus the tube-and-fin core and plastic end tanks of the stock unit. (Note: The stock unit is casted on one side and plastic on the other.)

DO NOT COPY

MISHIMOTO

RESEARCH & DEVELOPMENT



Testing of the 2006-2010 Chevrolet/GMC 6.6L Duramax Mishimoto Intercooler and Piping Kit

Test Vehicle

- 2006 Chevy 2500HD Duramax with 6-speed Allison transmission
- 5-inch exhaust
- Upgraded driver's side exhaust manifold
- Aftermarket intake
- Stage 2 tune

Apparatus

For hardware Mishimoto used the PLX sensor modulus 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.



MISHIMOTO

RESEARCH & DEVELOPMENT



Air intake temperatures (AIT) were recorded from the inlet and outlet 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. Mechanical gauges were used because of the high boost levels.

Sensor locations

1. Pre-intercooler air intake temperature (data logger)
2. Pre-intercooler boost pressure (mechanical gauge)
3. Post-intercooler boost pressure (mechanical gauge)
4. Post-intercooler air intake temperature (data logger)

Testing conditions

Ambient temperature range: 52°F to 54°F

Experiment

The test compares the Mishimoto intercooler and piping kit with the stock intercooler and piping kit under constant conditions. Between runs, a 3-minute break ensured 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 core. Wind speed out of the blower was 20 mph. The truck was strapped down once, and the intercoolers were swapped out on the dynamometer so that both tests were conducted under exactly the same conditions.

MISHIMOTO

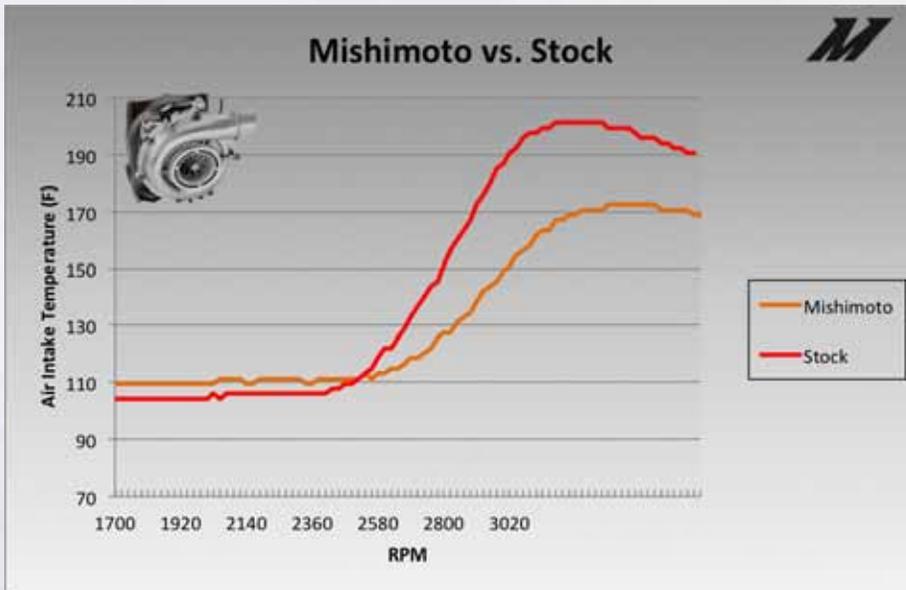
RESEARCH & DEVELOPMENT

Results

The test compares the air intake temperature (AIT) and boost pressure of both the stock and Mishimoto intercooler and piping kits. The Mishimoto unit showed a 15% (25°F) drop in pre-intercooled temperature as well as a 1-1.5 psi drop in pressure. The largest gains were seen with a full Mishimoto intercooler and piping kit installed on the truck. The engineers designed the hot-side intercooler pipe to be 3.0" (factory pipe is 2.5"), which resulted in great temperature decreases. The cold-side intercooler pipe was designed to be 3.5" with smoother bends, allowing for greater airflow compared to the plastic stock unit.



See charts and graphs below for details.



MISHIMOTO

RESEARCH & DEVELOPMENT

The screen shots shown below are from the video we made of the mechanical boost gauges. The stock intercooler unit showed a 3 psi drop in pressure, while the Mishimoto unit showed only about a 1.5-2 psi drop. Both units had the same outlet pressure of 30 psi, but the turbo had to work harder with the stock intercooler to reach the desired boost level.

Mishimoto boost comparison 1.5-2 lbs of pressure drop



Stock boost comparison 3 lbs of pressure drop



Conclusion

Using the Mishimoto intercooler and pipes on your truck will result in a lower pressure drop, which will increase the life of your turbo. This occurs because the turbo doesn't need to work as hard to produce the same boost levels inside the intake. If a customer moves to a larger turbo and tunes the truck, a Mishimoto intercooler and pipes become more desirable because of the lower restrictions and better cooling when compared to the stock unit.

Kevin McCardle
Product Engineer, Mishimoto Automotive