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MISHIMOTO ENGINEERING REPORT

Subject: Mishimoto 2013 Subaru BRZ / Scion FR-S Intake Hose

Introduction:

Here at Mishimoto we were determined to bring to market the best intake hoses that we possibly could. Many users on the Internet claim to know the best intake setup. We researched what other companies were doing and decided to take a more in-depth approach to testing. In particular we wanted to look at HP, TQ, and dB readings from inside the cabin. We decided to test all the variations and share the results with the FR-S/BRZ community.

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Test Report for 2013 Subaru BRZ / Scion FR-S for Intake Hose

Testing Equipment

1. DynoJet 424X with linx
2. Tenma digital sound meter with data logging

Test

The test vehicle used was a 2013 Scion FR-S with no engine modifications. We tested four different intakes. All variations were tested on an OEM intake boot and with our Mishimoto silicone intake boot. The four variations are as follows:

1. Both resonator and noise amplifier installed
2. Plugged resonator but with the noise amplifier still hooked up
3. Resonator attached but with the noise amplifier plugged
4. Both resonator and noise amplifier plugged

All the tests were performed on our DynoJet with constant conditions. Each test was performed three times, and an average of the three tests was recorded to find the setup that worked best. **Note: Tests 9, 10, and 11 were conducted with an aftermarket high-flow filter to show what could occur if the intake and the filter were changed.

Results

See the figure on the next page for results. The three tests shown with the colors green, red, and blue represent the three main setups. Test 1, shown in green, is a 100% OEM setup. Test 7, in red, is the setup that Mishimoto recommends. Test 8, in blue, shows what other aftermarket companies are doing.

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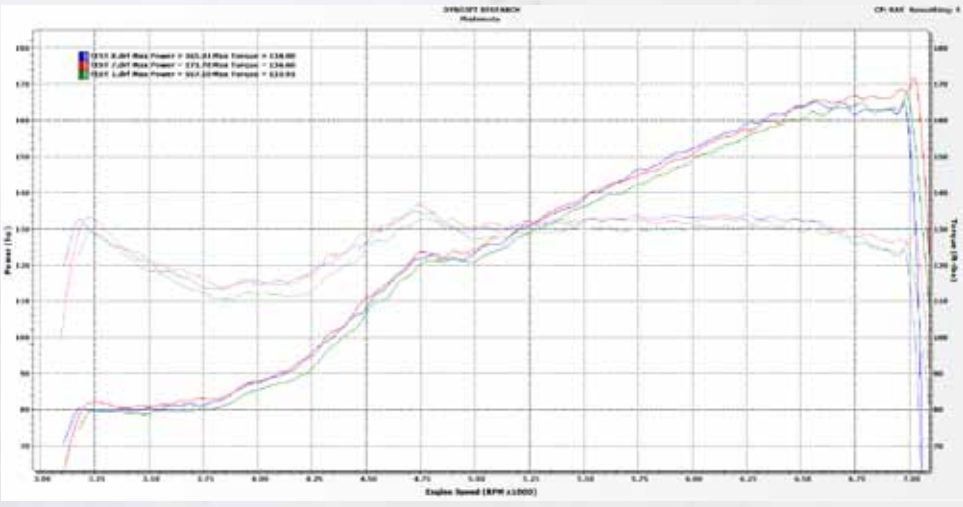
TEST	RES.	NOISE AMP	INTAKE TYPE	FILTER TYPE	HP	TQ	dB
1	YES	YES	OEM	OEM	167	133	87
2	X	YES	OEM	OEM	167	134	90
3	YES	X	OEM	OEM	167	132	85
4	X	X	OEM	OEM	165	133	87
5	YES	YES	MISHIMOTO	OEM	169	135	87
6	X	YES	MISHIMOTO	OEM	167	135	89
7	YES	X	MISHIMOTO	OEM	170	135	84
8	X	X	MISHIMOTO	OEM	165	134	89
***NOTE EACH TEST IS AN AVG. VALUE OF 3 DYNO RUNS							
9	YES	YES	OEM	HIGH FLOW	169	133	86
10	X	X	MISHIMOTO	HIGH FLOW	168	135	91
11	YES	X	MISHIMOTO	HIGH FLOW	173	136	86
***NOTE EACH TEST IS AN AVG. VALUE OF 3 DYNO RUNS							
OEM		Mishimoto Recommended		Other Competitors		Best Results	

Dyno Data

In figure below you will notice that tests 7 and 8 are both 3-4 hp more than stock - almost the entire power band. It's only in the last 500 rpm that test 7 shows better performance than both tests 1 and 8.



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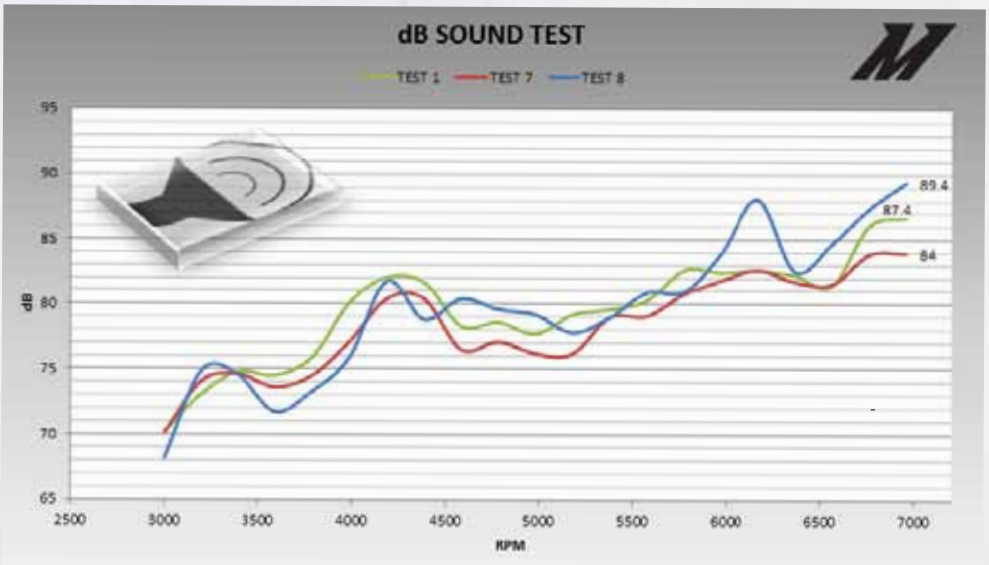
Sound Data

Using our dB meter we were able to capture the differences in engine noise inside the cabin with different setups. Mishimoto engineers were surprised at the differences they could actually hear between the various setups. After studying all the graphs, we noticed a definite pattern in the test: Basically, the resonator eliminates noise while the sound amplifier adds noise. This happened in almost a 1:1 ratio, meaning that when the resonator was hooked up, we would subtract 2-3 dB from the total noise, and when the noise amplifier was hooked up, we would add 2-3 dB to the total noise. The OEM unit had both the resonator and noise amp hooked up so they cancel out each other in terms of dB, which explains why test 1 fell in the middle of the graph between tests 7 and 8.



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Conclusion

Mishimoto engineers recommend using the Mishimoto intake tube with the OEM resonator installed and the noise amplifier deleted. This setup provided the best HP and TQ as well as the lowest noise in the cabin. The Mishimoto intake includes a plug for the resonator if the user chooses not to reinstall the OEM resonator, preferring the engine to be louder.

Overall I hope this report will help the FR-S/BRZ owners understand the differences between various intake setups and help them choose the setup that is best for them.

Kevin McCardle
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