

# ENGINEERING REPORT

2024 Toyota Tacoma 2.4T Performance Intake | SKU: MMAI-TAC-24

By: **Ye Liu**, Mishimoto Product Engineer

## REPORT AT A GLANCE

- **Goal:** Develop a precision-engineered, direct-fit performance air intake system for the 2024+ Toyota Tacoma 2.4L turbocharged engine platform.
- **Results:** Dyno and bench testing revealed that the Mishimoto intake system enhanced engine output throughout the RPM range, with max gains of 11.55 horsepower and 10.61 lb-ft of torque. Flow bench testing demonstrated a decrease of up to 27.7% in intake restriction compared to the factory intake system.
- **Conclusion:** This performance air intake provides a tangible performance boost and a more aggressive induction sound, all while maintaining full compatibility with the factory engine calibration—no custom tuning is required.

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## DESIGN OBJECTIVES

- Improve volumetric airflow and reduce pressure drop across the intake system.
- Maintain appropriate MAF scaling to ensure safe operation with the stock ECU calibration.
- Deliver a durable, heat-resistant construction suitable for long-term use in off-road and on-road conditions.
- Bolt-on installation using standard hand tools with no irreversible modifications to the vehicle.
- Provide audible enhancement of engine and turbocharger acoustics.
- Ensure compatibility with future Mishimoto charge pipe upgrades.

## MATERIAL SELECTION

The Mishimoto Tacoma performance intake utilizes a roto-molded polyethylene airbox with UV inhibitors, providing thermal insulation and robust structural integrity. The MAF sensor housing is manufactured from glass-filled nylon via precision injection molding, ensuring dimensional accuracy and heat resistance. A four-layer silicone transition coupler connects the MAF housing to the turbocharger inlet pipe, replacing the OEM rubber hose for enhanced durability and improved airflow efficiency.



Figure 1: Stock Intake



Figure 3: 3D printed Mishimoto intake prototype

## DESIGN AND FITMENT

Development began with a complete evaluation of the OE intake system, which includes an air duct that seals against the hood, a panel filter, a closed airbox, and a rubber intake tube with a corrugated section. Key limitations identified include turbulence from the convoluted tubing, limited filter surface area, and thermally heat-soaked air path routing near the engine bay.

Our redesigned system addresses these constraints with a large conical filter featuring high-flow oiled or dry filtration media. The new airbox incorporates integrated fresh air inlets that draw from the OEM grille, featuring a significantly shortened and direct path to the filter while also providing insulation from engine bay heat. The silicone coupler, featuring smooth internal geometries, replaces the corrugated factory sections to reduce turbulence and pressure losses.

The Mishimoto airbox also features an optional secondary air inlet located on the lower side of the airbox, drawing additional air from inside the passenger-side fender. A rubber plug is provided to seal the secondary inlet for water-fording scenarios.

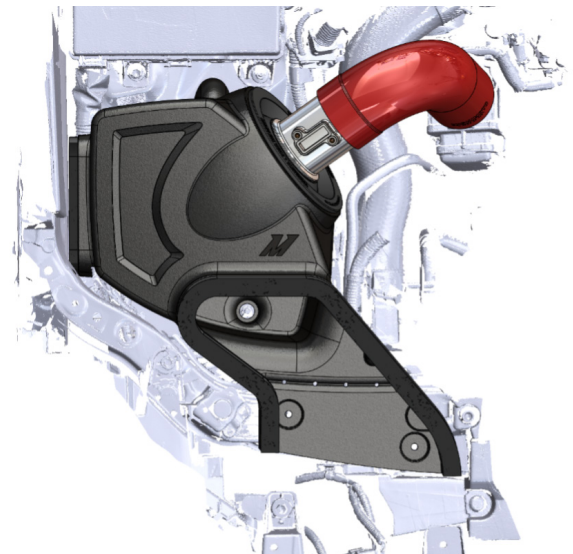


Figure 2: Mishimoto intake 3D design

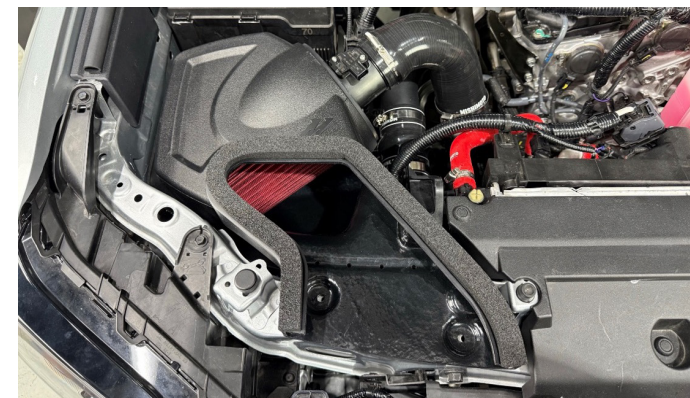


Figure 4: Mishimoto intake production sample

## SOUND TESTING

Enhanced acoustic feedback was a secondary objective of critical importance. The Mishimoto intake system produces a more pronounced and engaging turbocharger spool and blow-off sound under throttle, particularly during acceleration and gear changes. Sound levels remain refined during cruising, preserving OEM drivability characteristics.

## PERFORMANCE TESTING

All performance testing was carried out using our in-house AWD Mustang dynamometer. The Mishimoto intake yielded consistent power and torque improvements over stock, particularly in the midrange, where turbo response and airflow demand are highest, with maximum gains of 11.55 hp and 10.61 lb-ft.

The intake was also tested on the flow bench in both configurations, with the secondary inlet both closed and open. Results showed a 27.7% and 23% reduction in intake system restriction compared to the OEM unit, respectively, indicating a substantial increase in airflow efficiency.

## 2024 TOYOTA TACOMA PERFORMANCE INTAKE FLOW BENCH TEST

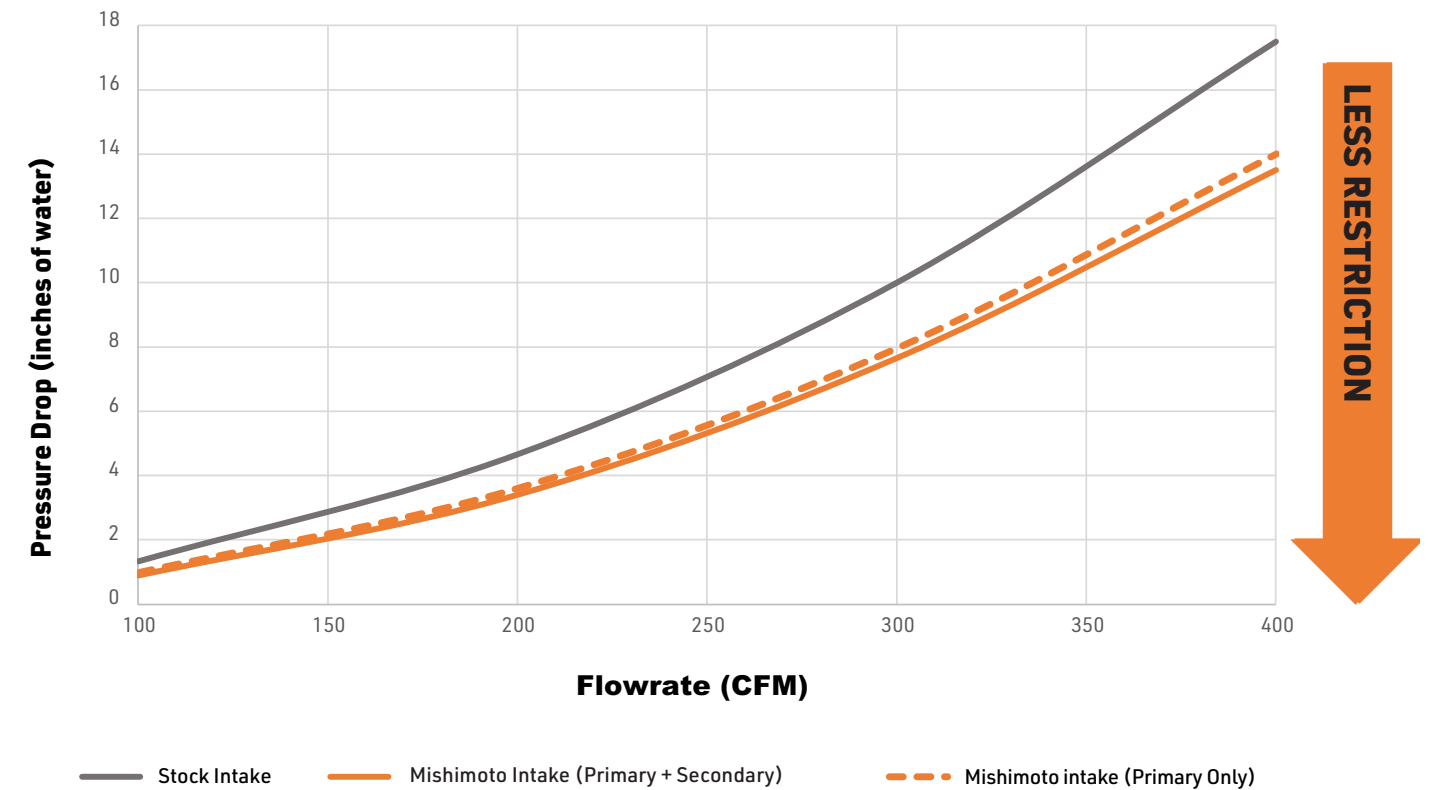
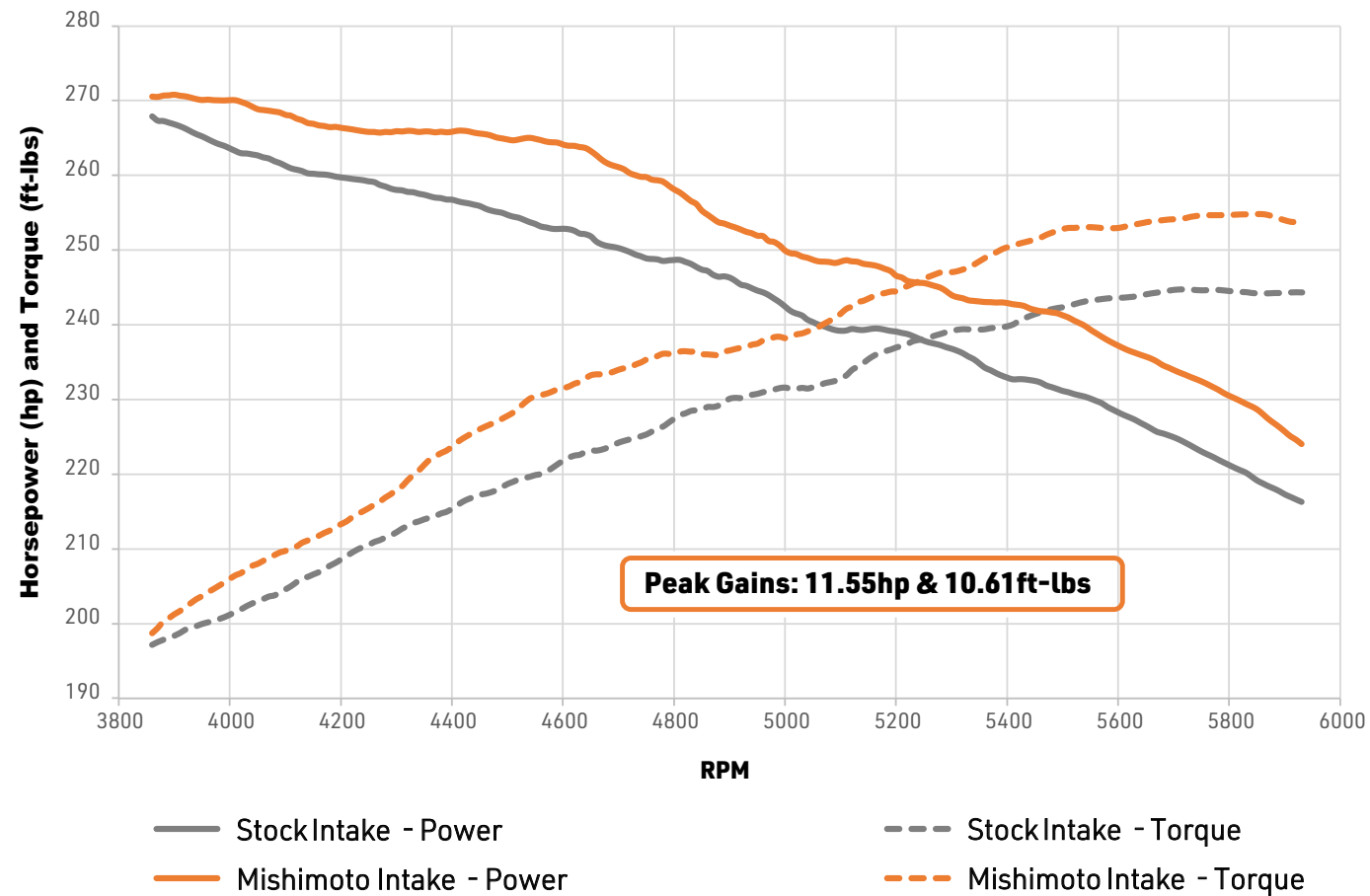


Figure 5: Dyno results

## 2024 TOYOTA TACOMA PERFORMANCE INTAKE DYNO TEST STOCK VS MISHIMOTO



Peak Gains: 11.55hp & 10.61ft-lbs

Figure 6: Flow bench results

### INSTALLATION NOTES

The Mishimoto Intake is a fully reversible, bolt-on system designed for the 2024 Tacoma 2.4T platform. It installs using OEM mounting points and requires no vehicle modification or tuning.

### TESTING DONE BY:

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