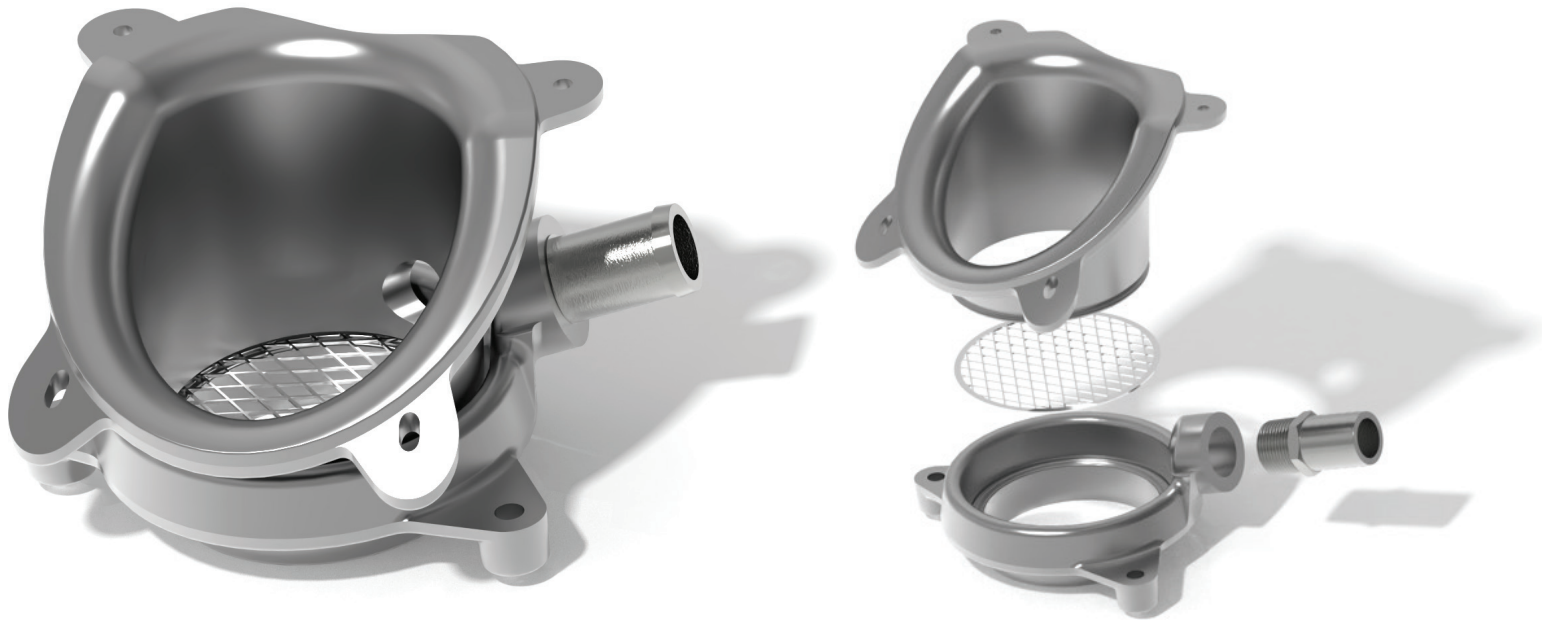


# MEET OUR NEW RANGE OF NIZPRO INDUCTION SYSTEMS

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STARTING WITH THE SUPER VELOCITY HIGH DENSITY INTAKE SYSTEM  
(SVHDIS) FOR THE YAMAHA F425/F450 XTO



# SUPER VELOCITY HIGH DENSITY (SVHD)

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Key to the performance of the SVHD is a cast alloy upper and lower section, finished using CNC machining techniques and designed with a rubber O-ring between these sections for 100% sealing. The SVHD Intake System has been designed to achieve two key performance improvements:

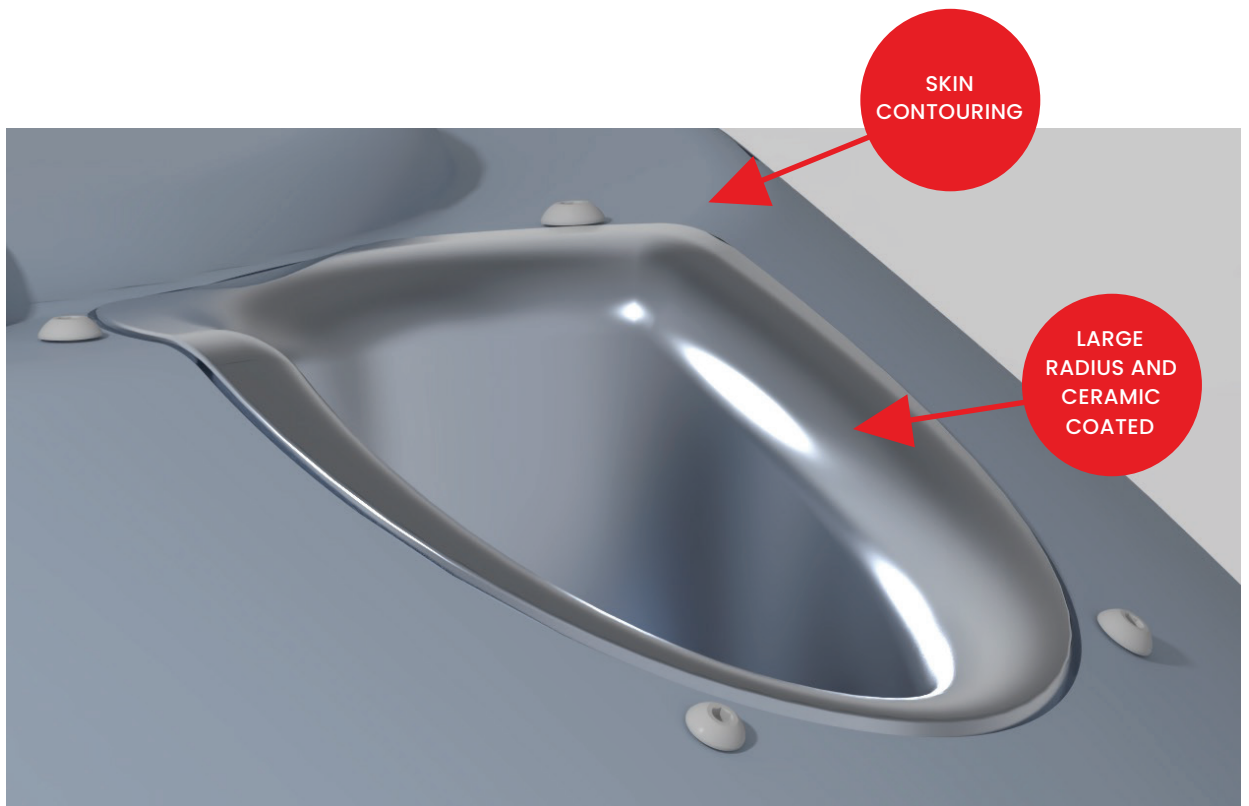
1. Streamline the airflow path to the engine, reducing pressure loss, and
2. Increase the air density via a supply of air at lower temperatures

Although we don't typically think about it, air has mass, and thanks to Isacc Newton we also know that any mass that is moving has momentum.

This momentum means that even air doesn't like to change direction once it is moving, and even less so when that direction is at right-angles to the current direction of flow and at high volumes.

By replacing the factory intake system with the SVHD Intake System the flow path for the incoming air is improved significantly, thanks to the carefully contoured air entry surface (shown to the right).

By following the contour of the inner skin surface and applying a large radius 'bell-mouth' to the entry, airflow characteristics are greatly improved through turbulence minimization, ensuring a smooth pathway for air to enter.

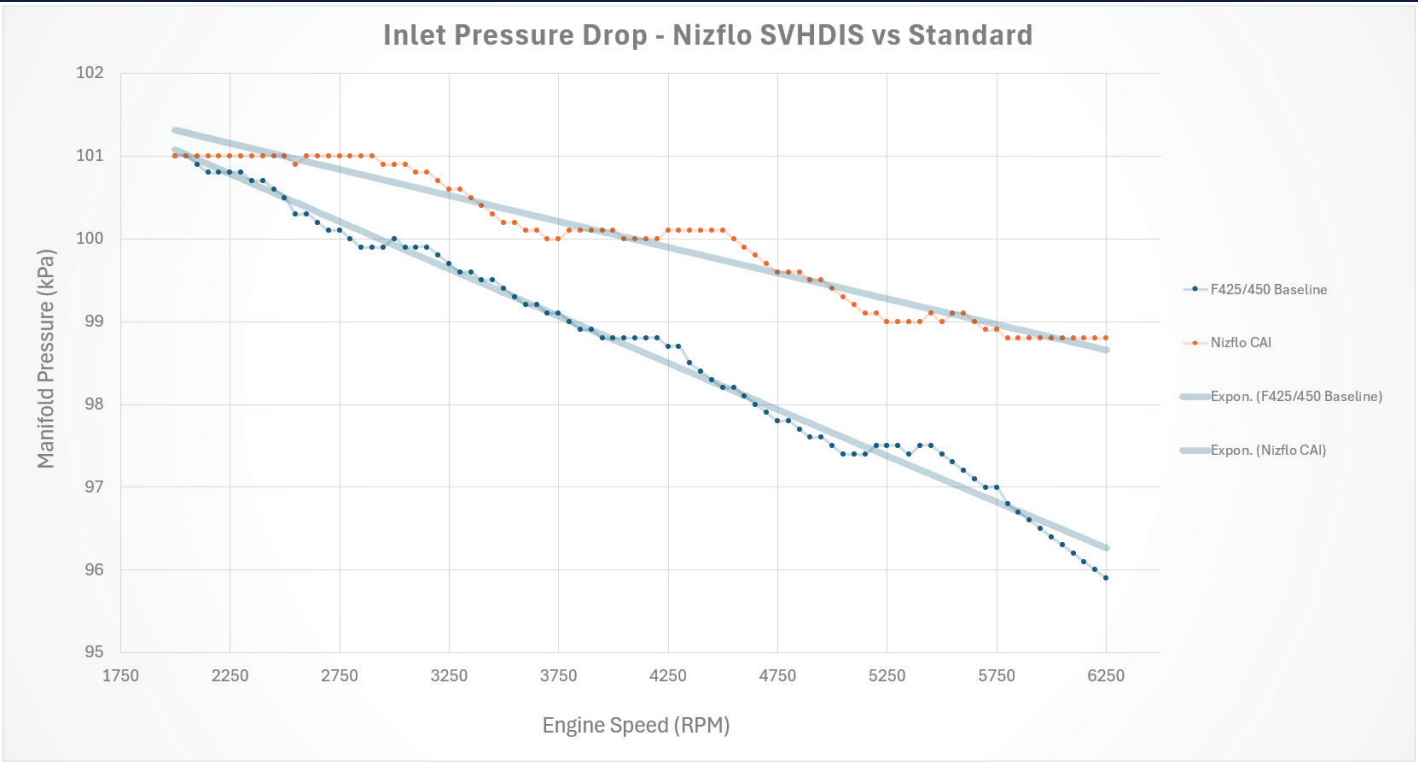


With an improved flow path, the pressure-drop which results from poor or restricted air flow is reduced. The graph below shows the Yamaha intake system (blue) vs the Nizpro SVHD Intake system, obtained during testing.

With pressure drop in mind, the protective intake mesh has also been optimised. Using the factory Yamaha mesh sizing as a baseline, the mesh was refined to ensure airflow is not impeded and to eliminate pressure loss across the mesh itself.

During testing, the pressure drop was reduced by as much as 2.4kPa at 6000RPM. This represents a 2.48% increase in air pressure which directly correlates to an increase in horsepower. In the case of the F425 XTO the net increase in pressure equates to an additional 5.8HP at 3500RPM and as much as 11HP at 6000RPM!

Next we will look at the density side of the equation. While the idea of supplying the engine with cold air has been commonplace in the automotive industry for a long time, there is nothing currently available to similarly improve the performance of our outboard engines.

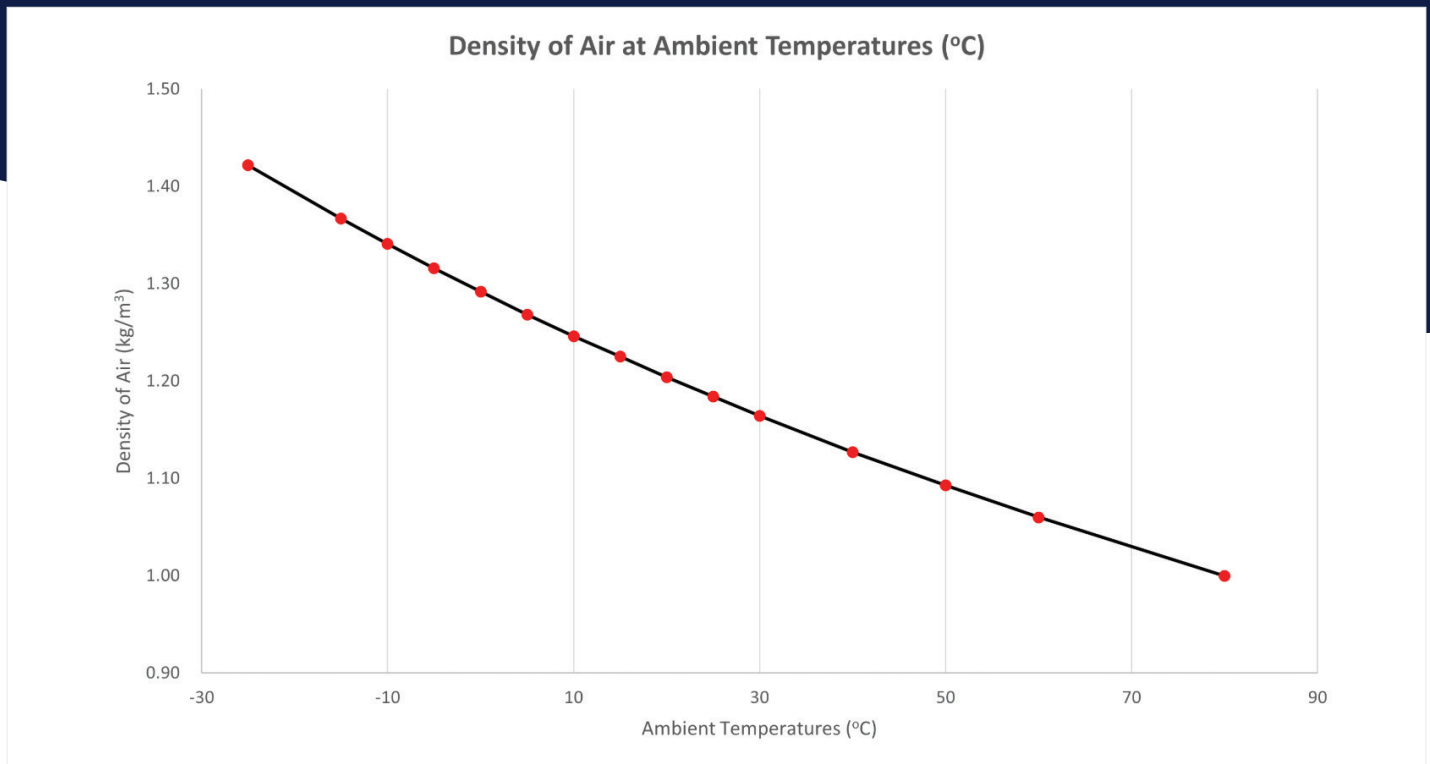


The idea behind them is simple; provide the engine with cooler (and therefore denser) air, and you can pack more oxygen atoms into the cylinder per cycle. This, along with the necessary fuel, can unlock more power potential in your engine. How much potential? Lets look at some numbers. We recently tested intake air temperatures on a V6 SHO 4.2L engine to understand this in more detail.

The under-cowl temperatures were high enough for us to record near 50°C (122°F) air being ingested into the engine. This particular test was run with an ambient temperature of 22°C (71.6°F). Air density is a function of pressure, temperature, and the amount of water vapour in the air (relative humidity).

To understand the effect of temperature alone we can run some simple numbers, keeping pressure and relative humidity constant. What we find is that by reducing the air temperature from 50°C to 22°C we increase the density by as much as 12%.

The graph below shows this relationship more generally:

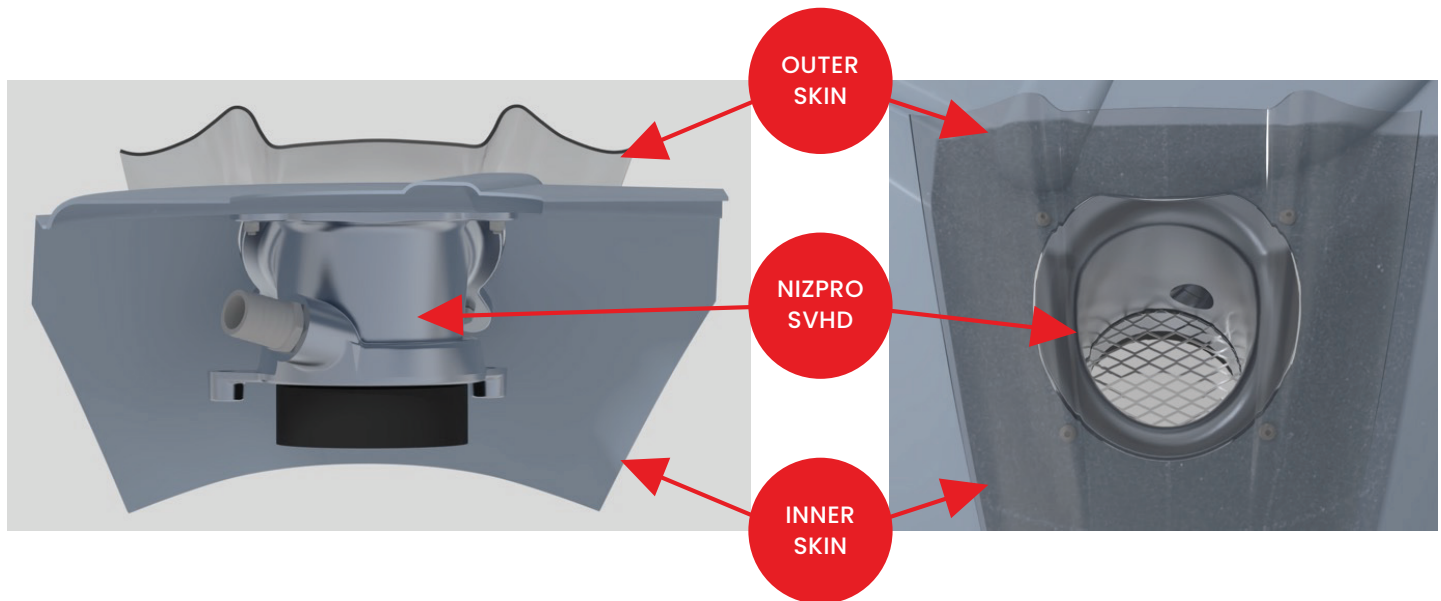


The new Nizpro SVHD Intake system, so far developed for the F425/F450 XTO, takes advantage of this phenomenon by drawing ambient air from outside of the powerhead compartment.

In the graphic below you can see the outer 'skin' of the cowl, and the inner skin which separates the powerhead compartment.

While the 12% gain using our example is theoretical in nature, Nizpro Marine was able to increase peak power from 434.6HP to 482 HP at 6000RPM using the SVHD intake system, representing a 10.9% increase in horsepower.

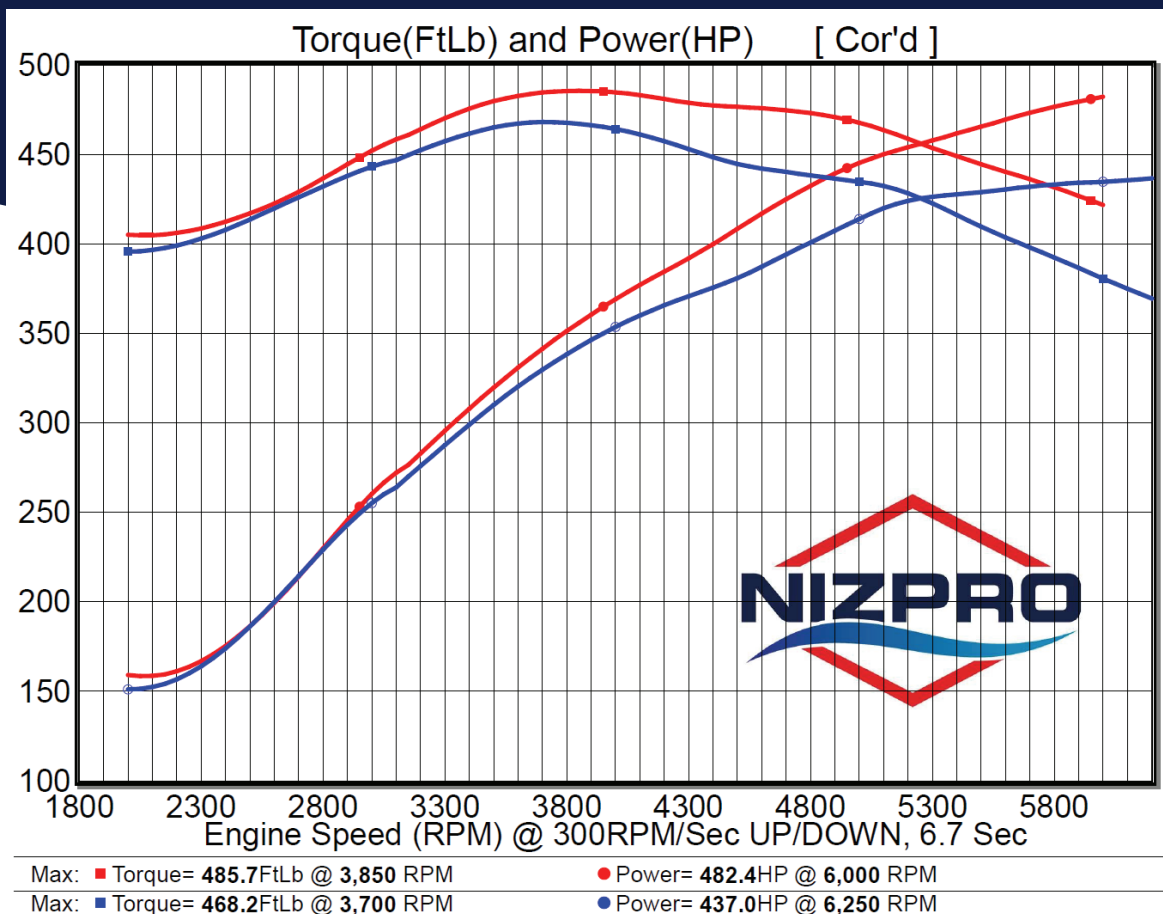
The additional 1.1% gets lost to factors such as pumping losses and other areas where achieving 100% efficiency isn't typically realistic or obtainable, but a double-digit increase is more than enough to get excited about.



If we look more closely at the full dyno chart (below), comparing the Nizpro Commercial calibration and the 482 SVHD calibration, the gains from the increase in air density and lower pressure drop can be seen from as low as 2000rpm.

Torque is up by 10ft-lb (8hp) and once the camshafts start to move into their optimum operating range (>3000RPM) the torque and horsepower gains continue to grow, averaging 4.5% gains through the mid-range. Torque gains continue to grow to 7.6% by 5000rpm, and 10.9% by 6000RPM.

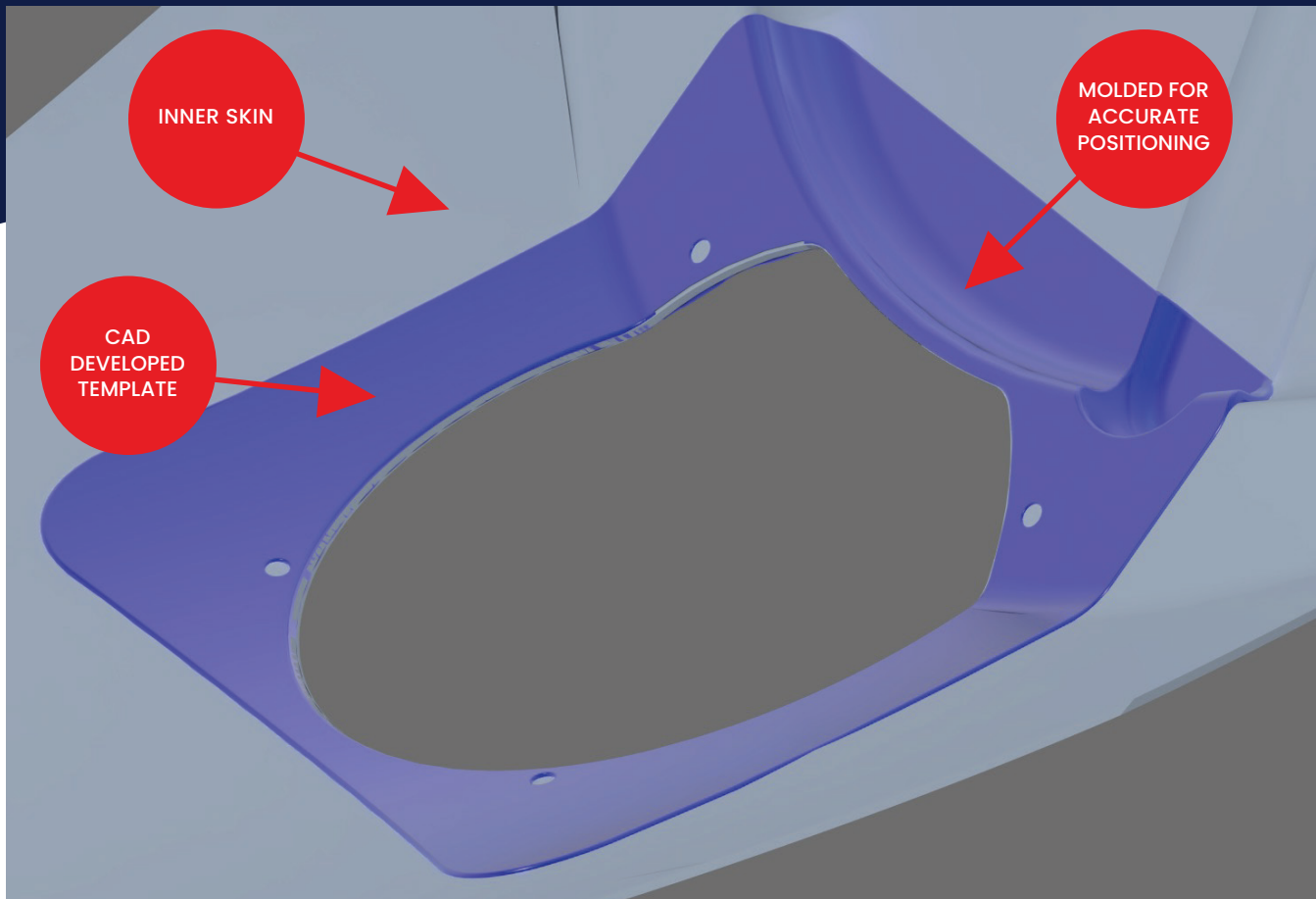
Although the dyno graph can only speak to full-throttle data, part throttle torque and horsepower also increase similarly, as every load and RPM site in the ECU calibration is refined to take advantage of the SVHD Intake System. After all, cold air is cold air, no matter where you operate the engine.



You may be thinking 'how hard is this going to be to install'? It's actually pretty simple, by design. The SVHD comes in two pieces, a lower section and an upper section. The lower section is a direct fit to the throttle body using the factory mounting bolts. The upper section, mounted to the cowl, requires a hole to be cut out from the inner skin.

This has been made easy by using the CAD-developed, vacuum formed, template which is provided in every kit.

The template accurately locates on the inner surface of the inner skin which is then marked. The resulting cut can then be performed accurately, and with confidence, for a seamless finish. Once the external Cowl cap is re-fitted, no one even knows you have added 45 hp to blow them away.



The SVHD system comes ready to install with full instructions and includes:

ALLOY CNC MACHINED  
INTAKE BELL MOUTH  
CERAMIC COATED TRUMPET

ALLOY CNC MACHINED  
THROTTLE BODY DIRECT  
FIT ADAPTOR

FOUR M6 STAINLESS STEEL  
BOLTS, WASHER AND  
NYLOC NUTS

SEALING O-RING

STAINLESS STEEL OPTIMISED  
INTAKE SAFETY GRATE

CAD-DEVELOPED MOULDED  
PLASTIC CUTTING TEMPLATE

INSTALLATION  
INSTRUCTIONS

We even added a ceramic coating to greatly reduce engine compartment heat being transferred into the SVHD Intake System.

This coating also adds a great finish and corrosion protection from the elements.

A 45 HP power increase has never been so easy or cost effective.



***DON'T GET  
LEFT BEHIND***