



## Start Up Procedure for Engines

The purpose of this document is to better familiarize you with all the steps needed to be taken to ensure that your engine is properly broken in.

Proper break-in procedure is critical to ensure your engine will achieve maximum performance as well as longevity. **Failure to follow these steps can cause engine damage**

The following steps discuss the process we recommend for the initial start up of one of our engines.

1. Fill the cooling system with appropriate coolant per your application. We recommend using a vacuum type fill system to ensure all air is out of the coolant system.
2. Fill the engine with proper weight break-in oil to the middle-full level on the dipstick. If you have a pressurized primer, now would be the time to prime the oil system.
3. Check the routing of all belts, hoses, and wiring to make sure they are clear for start up. It is important to make sure all connections are correct.
4. Hook up a wideband device so air/fuel can be monitored during start up.
5. Start the engine. If it doesn't start within 10 seconds of cranking, verify that everything is properly connected. Do not continue cranking for longer than that. Excessive cranking can lead to fuel washing the

cylinders if the injectors are firing. This can cause ring damage as well as allowing metal to metal contact as there will be no oil pressure.

6. As the engine starts, the first things to monitor are oil pressure, water temperature, and rpm. Stop the engine immediately if any unusual noises are present.

7. Do not run any longer than is needed to verify everything is operating correctly.

8. Stop the engine and visually check for fluid leaks. At this time you should also check engine oil, coolant level, and add fluids as necessary.

9. We now recommend putting the vehicle on a chassis dyno to check ignition timing and monitor your wideband device. Once air/fuel and ignition timing are verified safe, run the vehicle at medium load to get it up to temperature.

10. Once the engine has reached coolant operating temperature, switch to running from a medium load to a medium/heavy load. This can be accomplished by running the car in a higher gear (4<sup>th</sup> or higher) at a varying rpm range (2500+/-) for approximately 10-15 minutes.

11. Stop the engine and visually check for fluid leaks, engine oil level, and coolant level. Add fluids as necessary.

12. At this point you can now start to make power pulls on the dyno.

13. "Sneak up" on the tune by making short pulls while monitoring oil pressure, coolant pressure, air/fuel, and timing.

14. We recommend changing the engine oil and filter after the initial dyno session.

## Oil Notes

We recommend a good quality mineral based or break-in oil. After the break-in procedure you may use a good quality synthetic oil for the remaining life of the engine. Select the appropriate weight oil for your application. Brad Penn, Joe Gibbs, VR1, and Amsoil are all good options. Only use a good quality oil filter. We recommend a 20W-50wt oil unless otherwise noted.

Once your engine is broken in fully we recommend changing your oil every 2500 miles. If your vehicle is used for racing events such as drag racing, half mile racing, or track days we recommend changing your oil after every event. It is important to remember, there is no such thing as changing your oil and filter too often.

## Installation Notes & Warnings

1. Failure to follow start up procedure can result in engine damage, increased wear, and reduced engine performance.
2. Engines and short blocks are packaged and lubricated to prevent corrosion and contamination. We recommend not allowing engines to sit for extended periods of time.
3. We recommend having your engine installed by an experienced professional. Failure to do so can result in engine damage.
4. Exceeding the Horsepower and Torque specifications and/or recommended boost levels can also result in engine damage.
5. Remember that a proper tune is essential to engine longevity. Do not use the stock tune on a modified engine. Excessive fuel from an improper tune can wash the cylinder rings and damage the engine.

Lean conditions can also damage rings, pistons, and cause major engine damage. If the tune is not correct the engine will not achieve peak performance.

# Final Notes

If at any time you have questions regarding the proper way to break-in your new FFRE Engine please feel free to call us or email us.

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Tuners - **STOP** chasing HP numbers. Please remember the customer is looking for a trouble free experience and will never notice small differences in peak horsepower.

If the previous engine had a failure its crucial to replace the oil cooler and lines.

We recommend using a Coolant Pressure sensor to monitor how well the cylinder head gaskets are sealed.

It is important to inform the end user about the appropriate octane fuel along with recommended boost levels for the fuel you are running.

All customers must be informed about operating temperatures and service intervals. Do not assume the end user knows this information.

At Fast Forward Race Engines, we strive for perfection in every aspect of the engine build. We take considerable steps to ensure that cleanliness, precision, and quality control are held only to the highest standards. These aspects are critical for engine life and performance. We ask that you do the same.

Thank You,  
Fast Forward Race Engines