The Future Starts Here | How to become a good emissions driver

Integral Powertrain (IP) prides itself on being the UK's only independent testing facility capable of providing certified emissions testing from passenger cars to light commercial vehicles. Their Emissions and Driveline Test Facility (EDTF) has recently undergone a multi-million-pound investment to re-enforce its position and capabilities and ensure compliance to national, EU and International standards and regulations.

These tests are carried out by a team of highly qualified and experienced emissions test engineers and in this blog, Integral Powertrain's Emissions Testing Team Leader, David Tang explains what it takes to be a good emissions driver.

Firstly, before you need to know how to perform a good emissions test, the scene needs to be set. Emissions tests are carried out in specialist laboratories (less white coats and coloured chemicals than you might picture), they are temperature and humidity controlled environments to ensure tests are repeatable day to day, and location to location.

Complete vehicles are mounted on a chassis dynamometer (sometimes called a rolling road or dyno for short) which is used to mimic the force of a vehicle driving on the road. Analysers take vehicle exhaust gas samples as its driven on a set speed-controlled cycle. How closely you match to the speed on the cycle, depends on how precise a driver you are.

There are 4 key things new technicians and apprentices are taught when they first start driving emissions cycles; smoothness, look at what is ahead on the trace, never wear your seatbelt and no hands on steering wheel!

For safety reasons, seatbelts should never be worn whilst performing a lab based test. Ironically, the opposite of when on the road but, it is to ensure you can escape from the car quickly and safely if a mishap happens on the dyno. Coincidentally, there is no need for hands on the steering wheel after the car has been properly aligned; if you do, there is a temptation to move the wheel slightly which could cause you to crash (while not actually going anywhere).

Smoothness

The pedal directly under your right foot can be considered the Carbon Dioxide (CO_2) pedal, the more you push, the more you make. However, the regulated emissions – Carbon Monoxide (CO), Total Hydrocarbons (THC) and Nitrogen Oxide (NO) & Nitrogen Dioxide (NO_x) are harder to correlate.

As a driver, you can influence them by the speed at which you move the accelerator pedal, rather than the position of it. Very simply put, a vehicle uses a closed loop feedback system to monitor it's emissions. It relies on sensors in the exhaust to feedback the oxygen level on the previous rotation (lambda), and the demand you have requested by pressing the accelerator to calculate the amount of fuel needed on the next rotation. The quicker you make these accelerator

adjustments, the harder it is for the system to keep up.

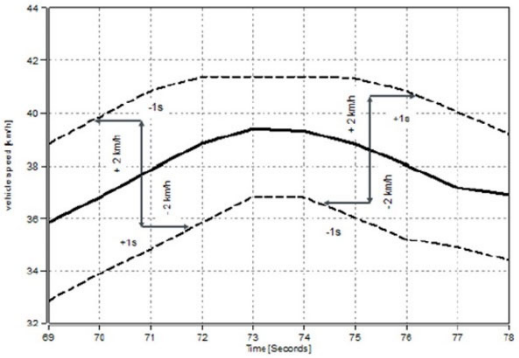
Exuberant movements on the pedal will push the engine between Rich (too much fuel), and Lean (too much air) too quickly, effectively overloading the catalyst. Rich running will cause spikes in CO and THC, and Lean events will spike NO_x. The smoother you treat the throttle, the easier this feedback loop is working to keep all under control.

So, what can you do as a driver?

Accelerations are a vital part of any of the speed traces so pre-empting them is essential for a good drive. Gently feathering in the acceleration is always going to be better than having to bury the throttle because you are half a second behind the trace.

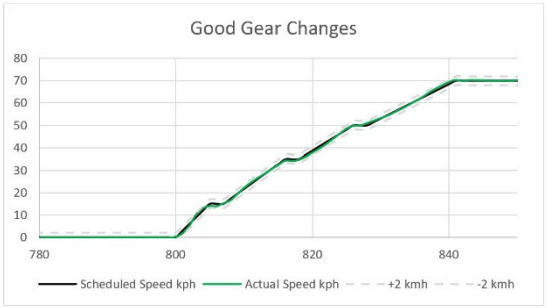
Do not pulse the throttle on steady state sections. If you find yourself 0.5kph under your line on a long steady state, it's much better to stick there than try to meet the line, overshoot, and create a Sine wave type trace.

Look at what is ahead on the trace. Each trace has a "tolerance". These are imaginary lines that you are allowed to be within. For example, the WLTC trace allows a 2kph and 1s window around the speed point. This should be used to keep your driving as smooth as possible.

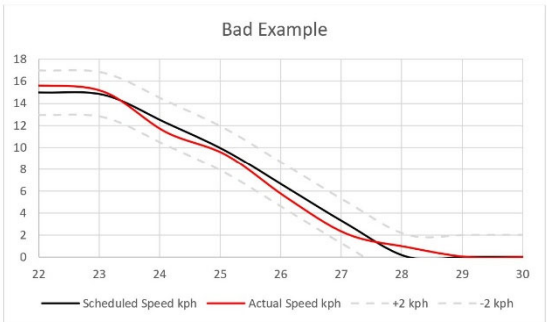


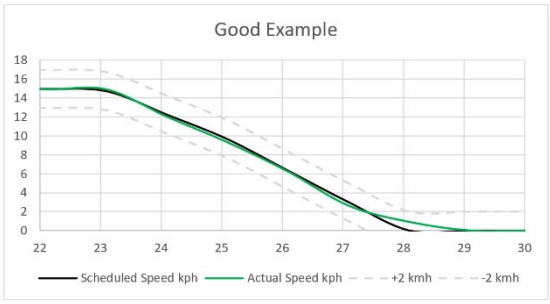
Gear changes mid acceleration or deceleration can catch out drivers too. Again, getting slightly ahead on the trace,

anticipating the 1 second gear change will drop your speed a bit. This means the subsequent acceleration is smoother and you aren't playing catchup on the trace.



On the other end of the scale is the deceleration part of the trace where you need to feel how responsive the brakes are. Applying too much pressure (heavy footed) will put you under the trace and cause violations whereas not enough pressure and you will lag behind the trace. Usually after the first hill, you can tell how much pressure is needed on the brakes to match the trace.





To master all of this takes time and experience and at Integral Powertrain we are pleased to have an excellent team of test specialists, engineers and technicians providing a wealth of expertise in testing to regulations and standards, to client specific requirements and in the development of appropriate test procedures and methods. To learn more take a tour of our website or call 01908 278600 to discuss your requirements with one of our emissions' specialists.

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