



What is FMVSS126?

Federal Motor Vehicle Safety Standard #126 is a ruling requiring the inclusion of Electronic Stability Control (ESC) on all new vehicles, and has been developed with the goal of reducing the serious risk of vehicle rollover accidents.

Legislation Dates

The American National Highway Traffic Safety Administration (NHTSA) has proposed the FMVSS126 regulation for testing the effectiveness of ESC systems. This will make ESC mandatory in the US for new cars by 2012, with a phase-in schedule from 2009. The European Commission has said that it is considering introducing similar legislation on all new cars in 2009.



Test Equipment Required

The test dictates a level of performance that the ESC system has to achieve. One of these relates to the maximum yaw rate of the vehicle at various points during the test and another tests responsiveness of the vehicle by measuring the deviation distance achieved after a significant steering input.

This distance must be measured very precisely in order to obtain accurate results. NHTSA recommend using an expensive inertial grade IMU, compensating for body roll, and then double-integrating the acceleration to obtain a distance measurement. However, this is an expensive and potentially inaccurate method.

All of the parameters required can be measured simply using a **Racelogic VBOX 3i** 100Hz Data Logger and an **IMU** (Inertial Measurement Unit), which provides a cost effective and reliable solution.

VBOX Installation and Compatibility

The **VBOX 3i** and **IMU** can be quickly installed into a vehicle without the need for calibration or specialist mounting equipment. The transfer of data between the VBOX and a steering robot is achieved using the CAN, Digital or Analogue interfaces.

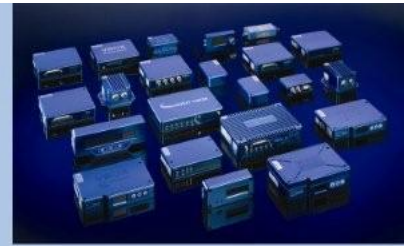


Accuracies

NHTSA do not specify accuracies for the FMVSS126 test, as this regulation is considered to be self-governed. However Racelogic devices and methods have been tested against high accuracy RTK GPS equipment. The calculation of lateral displacement was < 2cm of that measured by the RTK system.

VBOX 3i calculates Lateral Displacement at the Centre of Gravity of the vehicle using a process of roll angle and latency compensated single integration. This process of using a single integration of 100Hz GPS data negates the FMVSS126 requirement to use expensive accelerometers and rate gyros required in the double integration process.

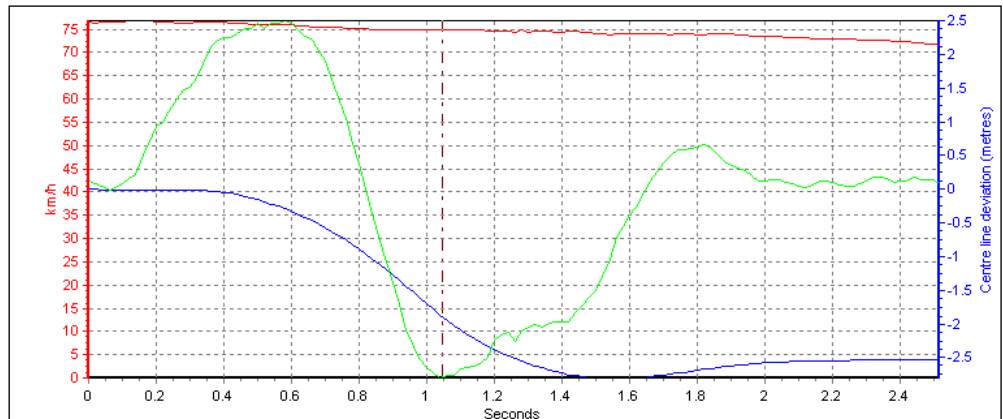
The **Racelogic IMU** contains a YAW rate sensor with an accuracy that is suitable for the 3 Yaw rate measurements required in the second phase of the sine with dwell manoeuvre of the FMVSS126 test.



Displaying Results

Racelogic are developing a dedicated software package that makes the operation of this test straight forward, so that the full FMVSS 126 test can be conducted without in-depth knowledge of VBOX or the intricacies of the FMVSS 126 regulations. The software will automatically perform all required calculations so that results of the Sine with Dwell manoeuvre are calculated and displayed live.

See right for sample data showing Yaw rate and a calculated deviation (Lateral Displacement) recorded by the Racelogic VBOX system in a manually controlled Sine with dwell manoeuvre.



What is Electronic Stability Control (ESC)?

Electronic stability control is a technology that improves the safety of a vehicles handling by detecting and preventing skids and slides, helping the driver maintain control of the vehicle. This technology is applied through a computerised system.

NHTSA estimates ESC will reduce single-vehicle crashes of passenger cars by up to 59%, with a much greater reduction of rollover crashes. US organization National Highway Traffic Safety Association, NHTSA, estimates ESC would save 5,300 to 9,600 lives and prevent 156,000 to 238,000 injuries in all types of crashes annually once all light vehicles on the road are equipped with ESC.

Typical vehicle positions during rollover crash. The driver loses control coming round the bend and overcorrects, which causes over-steer and throws the vehicle sideways. The forward momentum then flips the vehicle into a rollover crash.



Which vehicles is FMVSS126 applicable to?

FMVSS126 stipulates that ESC is required on passenger cars, multipurpose passenger vehicles, trucks, and buses with a gross vehicle weight rating of 4,536 Kg (10,000 pounds) or less.