Aquaplaning Software

Why test for Aquaplaning?

Every vehicle function that changes direction or speed, from turning to accelerating to braking, places a load on the tyres. Control of this load relies on the friction between the tyre and the road surface. More friction makes for a greater resistance to slipping; so a reduction in friction, such as in wet road conditions, may lead to the driver losing control.

Aquaplaning by a vehicle occurs when the water between the Vehicle's tyres and the road surface cannot be displaced, leaving a permanent layer of water between the tyres and the road surface. This causes the wheels to slip and prevents the vehicle from responding to inputs such as steering, braking or accelerating. As a result the vehicle can go out of control, particularly if the steered wheels are involved.

Tyre manufacturers need to consider the ability of a tyre to remove excess water from the road surface, which is a function of the vehicle speed and the tread pattern.

In order that various tyre tread patterns can be evaluated fairly, aquaplaning tests will need to be performed under consistent conditions, such as given below:

Water on the road which cannot be displaced causes aquaplaning
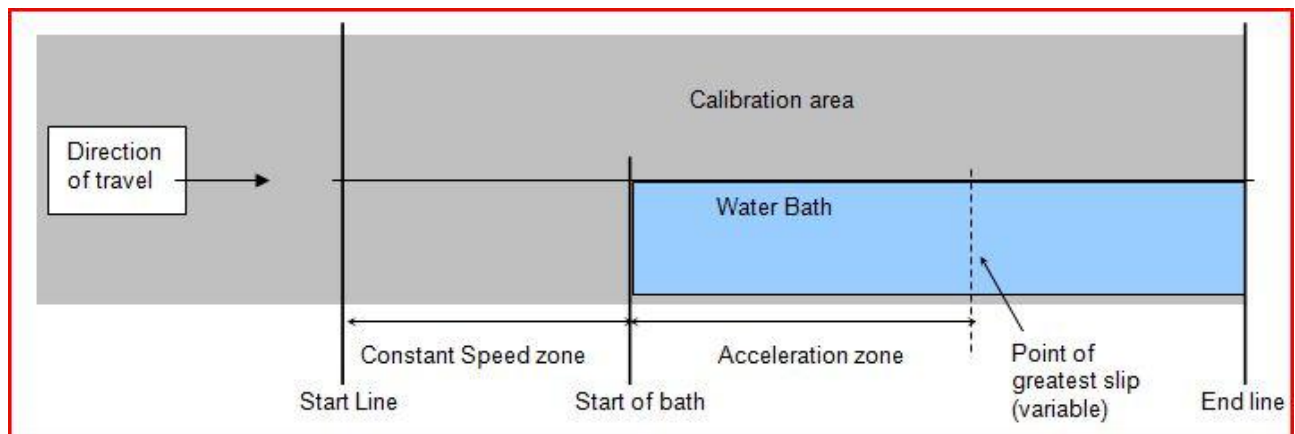
Test method

Using the test layout given above, the general procedure is as follows:

- Prior to test, a calibration of the wheel speeds in dry conditions must be performed by driving between the start line and end line. The calibration must be saved to calculate the % slip change between driving on a dry surface and driving on a wet surface.
- Accelerate to a required speed before reaching the start line (45mph for example).
- Hold this speed until the beginning of the water bath.
- Accelerate in the water with an immediate application of full throttle until aquaplaning occurs – the point of aquaplaning being defined as a pre-set percentage slip of one or more wheels. The percentage slip is calculated as a function of wheel speed against known GPS speed.

The distance travelled in the water prior to aquaplaning, combined with the speed reached at this point, can then be used as a measure of the tyres resistance to aquaplaning.

The Racelogic Solution

Racelogic has developed a software package for use with the VBOX range of data-loggers. Used in conjunction with one or more wheel speed sensors, the Racelogic Aquaplaning Software measures exactly where aquaplaning starts to occur, and the percentage wheel slip during the test.

The software has been designed to be simple to operate, whilst still offering maximum flexibility to the user.

Key Features

- **Simple to set-up and use**

- **Clear, easy to read indication of wheels speeds and percentage slip.**

- **Suitable for use with 2WD and 4WD vehicles**

- **Compatible with any VBOX data logger**

- **Fully configurable for customer specific requirements**

- **No in-depth VBOX knowledge required**

- **Automated wheel speed calibration procedure**

- **No external beacons required**
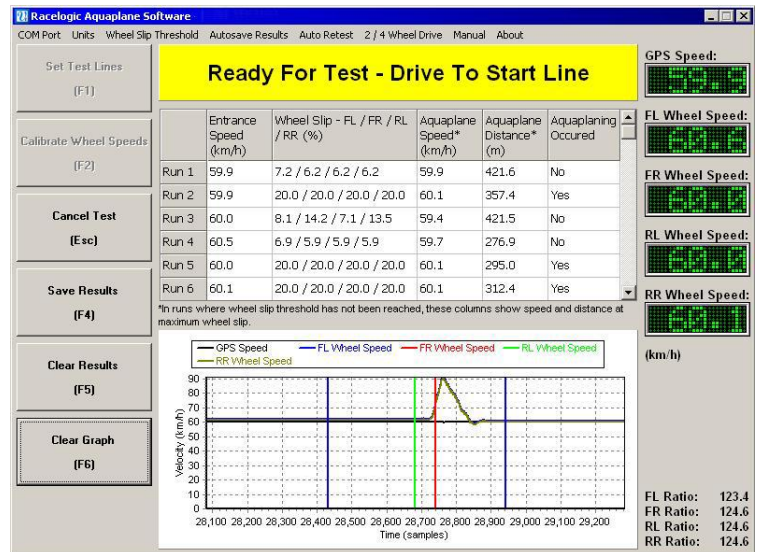
At the click of a mouse or push of a button, the user is able to set the start line, start of bath and end line. A further click starts the wheel speed calibration process, which is completed and stored automatically simply by driving between the start and end lines. The test can now begin!

The main software screen is made up of 5 distinct sections:

- A drop down menu toolbar for set-up and configuration of the tests.

- A set of buttons for defining the test splits, calibration of the wheel speed sensors, running the test and save options.

- A table of results, with test status indicator.

- A real time graph for graphical representation of the live GPS speed against the wheel speeds.

- Numerical indication of GPS speed and wheel speed in real time.

During the test the graph gives you a real time indication of your GPS speed, along with required wheel speeds, all displayed in different colours for clarity.

During normal driving, these will follow one another but at the point of aquaplaning any of these speeds will deviate from the GPS speed. This is augmented by the numerical windows which can display these speeds to 0.1 resolution, in either mph or kmh.

At the end of the test, the results table can be saved automatically to a file location of your choosing.