

Test Summary

Handling Tests on AlloyGator OE Alloy Wheel Rim Protectors

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Test Date: 19/11/15 and 2/12/15

Test Objectives

To evaluate the security of AlloyGator OE wheel rim protectors during the following tests:

1. Tyre Rim Roll-Off Test
2. Cornering Test

Specimen Description

The test vehicle was a Renault Clio III, modified for special purpose use, supplied by AlloyGator and loaded to 'kerb + full fuel + test equipment + driver and passenger'. The details of the test vehicle can be found within Appendix 1.

The test tyres and rim protectors were mounted onto the alloy wheels by the customer and these assemblies were then delivered to HORIBA MIRA for test.

Two combinations of tyre, wheel and AlloyGator OE fitment were evaluated as follows:

1. Standard wheel and tyre, no AlloyGator OE
2. Standard wheel and tyre, AlloyGator OE fitted

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Test Equipment

The calibration of measurement equipment used by HORIBA MIRA is checked on a regular schedule to traceable standards in an internal Quality Assurance of Measurement (QAM) Scheme. Where the calibration is found to be satisfactory each item is certified and identified with a QAM code. The codes for the items used in the work covered by this report are listed below:

Measurement	Equipment	Identification
Speed	RT3100, RT-ANA	QA29193, QA29194
Lateral Acceleration	RT3100, RT-ANA	QA29193, QA29194
Vehicle Mass	Weigh scales	QA008747, QA008748, QA008749, QA008750
Tyre Pressure	Tyre pressure gauge	QA035935
	Laptop	WS1737
	Strainbook	Q33815

Test Descriptions

Test Sample Preparation

The Tyre Rim Roll-off and Cornering tests were performed on different days. On each occasion, AlloyGator supplied the wheel, tyre and AlloyGator OE assembly to HORIBA MIRA already assembled and ready for fitment to the vehicle.

Vehicle and Tyre Warm-up Phase

The test tyres are inflated to the recommended cold inflation pressure at ambient temperature. The vehicle is then driven for 10 km at a speed of 50 km/h to warm the tyres. This procedure is repeated for all tyres subjected to the Tyre Rim Roll-off and Cornering Tests.

Tyre Rim Roll-off Test

The tyre rim-roll off test is designed to determine the critical inflation pressure at which a tyre will roll off its rim when subjected to high cornering forces. Applying this test method provides an indication of whether or not the AlloyGator OE affects the tyre retention properties of the wheel rim when compared to a standard wheel and tyre with no protector fitted.

Following a warm up procedure, the test tyre is deflated to 1.4 bar (experience has shown that pressures at and above this figure show no sign of tyre roll-off). The test vehicle is then driven in a straight line at 50 km/h before turning onto a 25 m radius circle in a clockwise direction and continuing for one whole revolution. The test tyre pressure is then reduced in 0.2 bar increments and the test repeated until one of the following occurs:

- The wheel rim protector, if fitted, detaches from the wheel
- The test tyre is clearly losing pressure
- The test tyre rolls off the wheel rim
- The wheel rim contacts the ground
- An inflation pressure of 0.8 bar is reached without failure

Cornering Test

The test is performed on MIRA's Dry Handling Circuit. The vehicle is driven in a straight line at constant speed before turning into a right hand corner with a radius of approximately 80 m. The test is repeated at incremented test speeds until either the wheel rim protector detaches from the rim or the limit of tyre adhesion is reached. The vehicle is instrumented to record speed and lateral acceleration during the test.

Results

Tyre Rim Roll-off Test

Both the standard wheel and tyre assembly and the wheel and tyre assembly with the Alloygator OE rim protector fitted performed the test down to a tyre inflation pressure of 0.8 bar without failure. For all runs between 1.4 and 0.8 bar there was no observed movement of the rim protector, no relative tyre rotation, no pressure loss, no tyre roll off or rim contact with the ground.



Figure 1 – Standard wheel and tyre assembly, post Tyre Rim Roll-off Test



Figure 2 – Wheel, tyre and AlloyGator OE assembly, post Tyre Rim Roll-off Test

Cornering Test

For all test runs up to and including the limit of vehicle cornering performance, the AlloyGator OE rim protector displayed no signs of detachment. No loss of tyre pressure occurred during the test.

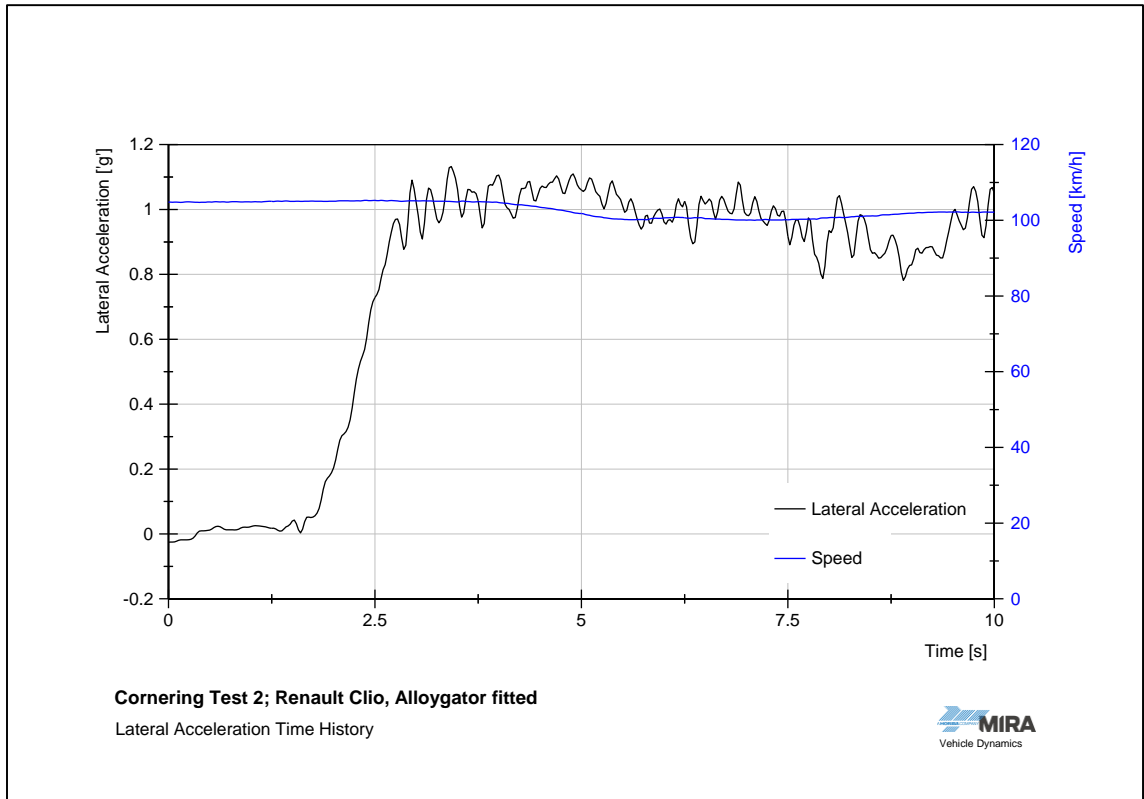


Figure 7 – Cornering Test objective data



Figure 8 - Wheel, tyre and AlloyGator OE assembly, post Cornering Test

Appendix 1 Test Vehicle Details

Vehicle Manufacturer	Renault
Vehicle Model	Clio III (modified for special purpose use)
VIN	VF1CR1N0639753601

Vehicle mass: Kerb + full fuel + test equipment (kg)	
Front Left	403
Front Right	380
Total Front Axle	783
Rear Left	219
Rear Right	257
Total Rear Axle	476
Total Mass	1,259

Vehicle mass as tested: Kerb + full fuel + driver + passenger + test equipment (kg)	
Front Left	442
Front Right	422
Total Front Axle	864
Rear Left	258
Rear Right	292
Total Rear Axle	550
Total Mass	1,414

Tyre Details	
Manufacturer	Michelin
Model	Pilot Sport 3
Type	215/45 ZR 17 91W
Cold Pressures	Front: 32 psi (2.2 bar) Rear: 32 psi (2.2 bar)

Appendix 2 Photographs

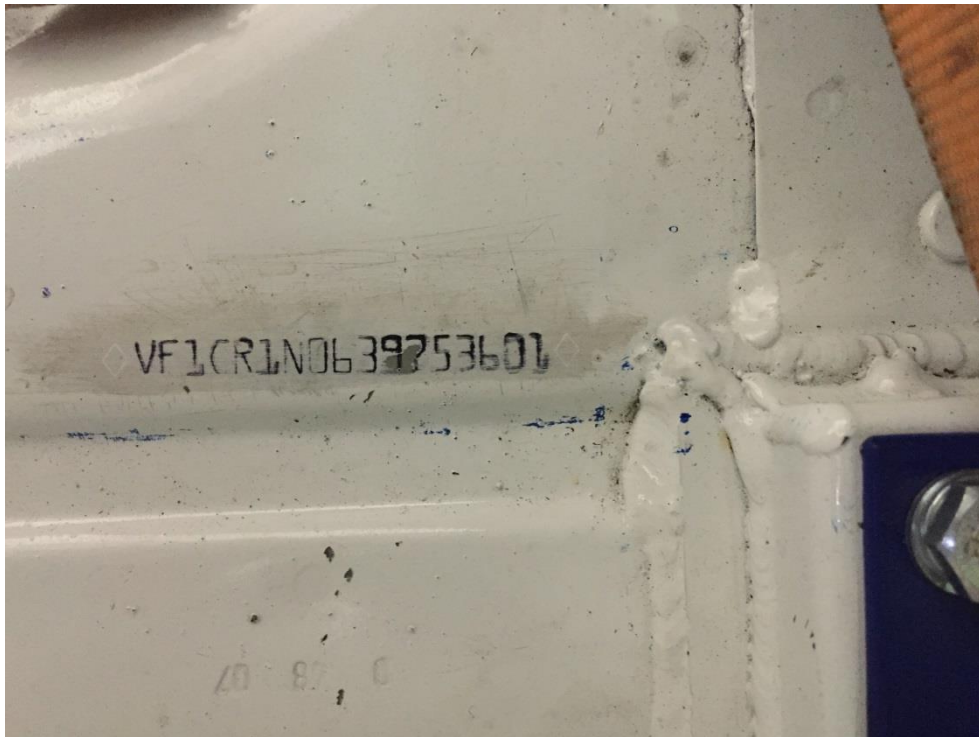


Figure 9 – Renault Clio VIN number



Figure 10 – Renault Clio test vehicle