

Test Results

Tyre rim roll-off tests with alloy wheel protectors

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Test Date(s)	20/04/2011		

Test Objectives

To evaluate the security of AlloyGator wheel rim protectors during 'Tyre Rim Roll-Off' tests.

Specimen Description

The test vehicle was a Honda Civic Type R (2007 Model) loaded to Gross Vehicle Mass (GVM) and supplied by MIRA. The details of the test vehicle can be found in Appendix 1.

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

- 'Tyre 1':- standard wheel and tyre, no AlloyGator
- 'Tyre 2':- unsuitable wheel and tyre, AlloyGator fitted
- 'Tyre 3':- suitable wheel and tyre, AlloyGator fitted, suspect join

Note: The same wheel and tyre sizes were used throughout; however the 'unsuitable wheel and tyre' combination featured a relatively large gap between the tyre bead and the wheel rim in comparison to the 'suitable wheel and tyre' combination.

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Approved By:



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Date: 01/11/11

Test Equipment

Measured Channel	Instrumentation	Identification
Speed	RT3000	QA28972
Lateral Acceleration	RT3000	QA28972
Vehicle Mass	Weighing Scales	QA008747, QA008748, QA008749, QA008750
Tyre Pressures	Tyre Pressure Gauge	QA008187
	Laptop Computer	WS594

Test Description

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 enables a comparison of how well the AlloyGator rim protector is retained for two different wheel and tyre combinations, and whether or not the AlloyGator affects the tyre retention properties of the wheel rim compared to a standard wheel and tyre with no protector fitted.

The test tyre is inflated 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 driven in a straight line at 50km/h and then steered onto a 25m radius circle in a clockwise direction. 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.

The test was performed with the test wheel and tyres fitted to the front nearside of the test vehicle:

Results

Tyre Rim-Roll off Test

All the three tyre combinations tested performed the test down to the low pressure limit of 0.8 bar without failure. There was no discernable rotation between the tyre and rim in each case, although the AlloyGator exhibited some relative rotation at the lowest test pressures. The results are summarised, for each tyre combination, in the tables and figures below.

‘Tyre 1’ – Standard Wheel and Tyre, No AlloyGator

Table 1; Tyre Rim Roll-Off Results, ‘Tyre1’	
Tyre Pressure	Observations
1.4 Bar	No rotation of tyre
1.2 Bar	No rotation of tyre
1.0 Bar	No rotation of tyre
0.8 Bar	No rotation of tyre



Figure 1 – 'Tyre 1' after Testing at 0.8 Bar

'Tyre 2' – Unsuitable Wheel and Tyre Combination, AlloyGator Fitted

Tyre Pressure	Observations
1.4 Bar	No rotation of tyre or rim protector
1.2 Bar	No rotation of tyre or rim protector
1.0 Bar	Small rotation of rim protector (Figure 2)
0.8 Bar	Larger rotation of rim protector (Figure 3)



Figure 2 – 'Tyre 2' after Testing at 1.0 Bar



Figure 3 – 'Tyre 2' after at Testing at 0.8 Bar

'Tyre 3' – Suitable Wheel and Tyre Combination, AlloyGator Fitted

Table 3; Tyre Rim Roll-Off Results, 'Tyre3'	
Tyre Pressure	Observations
1.4 Bar	No rotation of tyre or rim protector
1.2 Bar	No rotation of tyre or rim protector
1.0 Bar	No rotation of tyre or rim protector (Figure 4)
0.8 Bar	Small rotation of rim protector (Figure 5)



Figure 4 – 'Tyre 3' after Testing at 1.0 Bar



Figure 5 – 'Tyre 3' after Testing at 0.8 Bar

Attachments

Appendix 1 – Test Vehicle Details

Appendix 1 Test Vehicle Details

Vehicle Manufacturer:	Honda
Vehicle Model:	Civic Type R
Vin No:	SHHFN23407U000018

Weight as Tested

Front Left:	484.8kg
Front Right:	480.2kg
Total Front Axle:	965.0kg
Rear Left:	368.6kg
Rear Right:	370.2kg
Total Rear Axle:	738.8kg
Total Weight:	1703.8kg

Tyre Details

Tyre Type:	Bridgestone Potenza Reosoa
Tyre Specifications	
Tyre 1	225/40 R18 88Y
Tyre 2	225/40 ZR18 88Y
Tyre 3	225/40 R18 88Y
Tyre Pressure:	Front – 2.0 bar, Rear – 2.0 bar