

## Amendments to document ECE/TRANS/WP.29/GRRF/2014/23/Rev.1

This document is presented by the Italy to include some amendments in Revision 1 of the proposal. The modifications to the existing text of the Regulation are marked in **bold** for new or ~~strike through~~ for deleted characters.

### I. Proposal

[AMENDMENT 1]: Include a note (b) in Table A14/5.1.3.1.3 as follows:

#### 5.1.3.1.3. Fatigue test

According Table A14/5.1.3.1.3.

Table A14/5.1.3.1.3.

Thermal fatigue test								
Step	Vehicle gross weight	Initial speed	Final speed	Deceleration	Starting temperature before the brakings	Time between 2 following brakings	Brakings quantity	Rotation speed of the cooling fan
	[kg]	[km/h]	[km/h]	[m/s <sup>2</sup> ]	[°C]	[s]	[---]	[min <sup>-1</sup> ]
1 thermal	75% / discs q.ty	50% Vmax	5	7	100 (a)	30	5	2.000
2 functional	75% / discs q.ty	80% Vmax	5	8	200	---	1	3.000
3 mechanic	100% / discs q.ty	60% Vmax	5	10	200	---	2	3.000

Steps from 1 to 3 = 1 cycle; repeating for a total of 20 cycles (= 160 brakings) (b)

(a) Starting temperature of the 1° braking only

**(b) In case of early wear of the friction material of the pads, the use of another pads set is allowed; in this case, before completing the test, the new pads set must be burnished according to paragraph 5.1.3.1.1., always using the brake disc under test.**

[AMENDMENT 2]: Modify Table A14/5.1.4.1.1 as follows:

#### 5.1.4. Rear disc

##### 5.1.4.1. Test program

##### 5.1.4.1.1. Burnishing

According Table A14/5.1.4.1.1.

Table A14/5.1.4.1.1.

Burnishing							
Step	Vehicle gross weight	Initial speed	Final speed	Deceleration	Starting temperature before the braking	Brakings quantity	Rotation speed of the cooling fan
	[kg]	[km/h]	[km/h]	[m/s <sup>2</sup> ]	[°C]	[---]	[min <sup>-1</sup> ]
1	<b>50%</b>	60	30	2	100	60	3.000

[AMENDMENT 3]: Include a paragraph 5.1.4.1.2 as follows:

**5.1.4.1.2. Fade test**

According Table A14/5.1.4.1.2.

**Table A14/5.1.4.1.2.**

Fade test								
Step	Vehicle gross weight	Initial speed	Final speed	Deceleration	Starting temperature before the braking	Time between 2 following brakings	Brakings quantity	Rotation speed of the cooling fan
	[kg]	[km/h]	[km/h]	[m/s <sup>2</sup> ]	[°C]	[s]	[---]	[min <sup>-1</sup> ]
1	50%	40% Vmax	20% Vmax	2	100	30	15	800

[AMENDMENT 4]: Modify Table A14/5.1.4.1.3 as follows:

**5.1.4.1.3 Fatigue test**

According Table A14/5.1.4.1.3.

**Table A14/5.1.4.1.3.**

Thermal fatigue test								
Step	Vehicle gross weight	Initial speed	Final speed	Deceleration	Starting temperature before the brakings	Time between 2 following brakings	Brakings quantity	Rotation speed of the cooling fan
	[kg]	[km/h]	[km/h]	[m/s <sup>2</sup> ]	[°C]	[s]	[---]	[min <sup>-1</sup> ]
1 thermal	50%	40% Vmax	20% Vmax	3	100 (a)	30	5	2.000
2 functional	50%	50% Vmax (b)	5	4	200	---	1	3.000
		60% Vmax (c)						
		75% Vmax (d)						
3 mechanic	90%	40% Vmax (b)	5	5	200	---	2	3.000
		48% Vmax (c)						
		60% Vmax (d)						
Steps from 1 to 3 = 1 cycle; repeating for a total of 20 cycles (= 160 brakings) (e)								

(a) Starting temperature of the 1° braking only

(b) Disc diameter ≤ 245 mm

(c) Disc diameter > 245 < 280 mm

(d) Disc diameter ≥ 280 mm

(e) **In case of early wear of the friction material of the pads, the use of another pads set is allowed; in this case, before completing the test, the new pads set must be burnished according to paragraphs 5.1.4.1.1. – 5.1.4.1.2., always using the brake disc under test.**

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[AMENDMENT 5]: Amend definition paragraph 2.3.2 as follows:

"Identification code" identifies the brake discs or brake drums covered by the braking system approval according to Regulations Nos. 13, ~~and~~ 13-H and 78.

[AMENDMENT 6 editorial]: For consistency with R.E.3, modify L1, L2, L3, L4, L5 with: L<sub>1</sub>, L<sub>2</sub>, L<sub>3</sub>, L<sub>4</sub>, L<sub>5</sub>, throughout the document.

[AMENDMENT 7 editorial]: in Table A14/2.2.5, change the heading "spessore disco" with: "disk thickness".

[AMENDMENT 8 editorial]: in paragraph 3.4.2.1, change "part C" with capital "Part C".

## II. Justification

[AMENDMENT 1]:

The note has been introduced in order to allow the operator to finalise the test in case of premature wear of the friction material of the pads,

[AMENDMENT 2]:

The % of the "vehicle gross weight" has been reduced from 55% to 50% in conformity with what is foreseen in par 5.1.4.1.3.

[AMENDMENT 3]:

The proposed "Fade" test has the aim of stabilising the friction coefficient of pads.

The Fade test has the target of spilling the gas out from friction material, otherwise these gases leak during the "Fatigue" test causing a reduction of the friction coefficient.

This could bring to the need of an increase of braking pressure up to excessive value, so that a sudden consumption of the friction material may happen.

This phenomenon is typical for organic friction material, while pads with sinteric friction material are less subject to it.

[AMENDMENT 4]:

Three modifications have been proposed:

- the % of "vehicle gross weight" has been reduced from 55% to 50% (for step 1 and 2) and from 100 to 90% (for step 3), in order to optimize the mechanical stress on the brake disc, so as to reach a T<sub>max</sub> at around 500 °C.
- the threshold for the diameter of the rear discs has been modified from 240mm to 245mm in order to take into account a typology of rear discs typically used on sport motorcycles.
- A note (e) has been added, in order to allow the operator to finalize the test in case of premature wear of the friction material of the pads

[AMENDMENT 5]:

A reference to UN-R78 is needed for braking system of vehicles of category L.