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NB-Rail Association

RECOMMENDATION FOR USE

NB-RAIL COORDINATION GROUP

Administrative Decision according to Interoperability Directive
(EU) 2016/797 art. 30.6



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RFU-RST-310

Issue 02
Date 13/09/2022

TITLE

LOAD CONDITIONS FOR BRAKE TESTS

ORIGINATOR

TÜV SÜD Nederland

SUBJECT RELATED TO

Regulation (EU) 1302/2014 (TSI LOC&PAS),
amended by Reg. (EU) 2018/868, Reg. (EU)
2019/776 and Reg. (EU) 2020/387

AMENDMENT RECORD:

Issue 01 Voted at PLE-061 on 25/02/2021

Issue 02 Voted at PLE-065 on 23/06/2022. ERA comments integrated on 13/09/22.

DESCRIPTION AND BACKGROUND EXPLANATION

References:

- [1] EN 14531-1:2005, Railway applications – Methods for calculation of stopping distances, slowing distances and immobilization braking – Part 1: General algorithms
- [2] UIC 544-1, 6th issue 2014, Brakes – Braking performance
- [3] EN 16834:2019, Railway applications – Braking – Brake performance

Note: These standards are for background information and not all referred to in the TSI.

Background:

TSI LOC&PAS 6.2.3.8: Emergency Braking (clause 4.2.4.5.2)

- (1) *The braking performance which is subject to a test is the stopping distance as defined in the specification referenced in Appendix J-1, index 91 (= EN 14531-1:2005 [1], all sections). The deceleration is evaluated from the stopping distance.*
- (2) *Tests shall be carried out on dry rails at the following initial speeds (if lower than the maximum design speed): 30 km/h; 100 km/h; 120 km/h; 140 km/h; 160 km/h; 200 km/h; in steps not greater than 40 km/h from 200 km/h to maximum design speed of the unit.*
- (3) *Tests shall be carried out for the load conditions of the unit 'design mass in working order', 'design mass under normal payload' and 'maximum braking load' (as defined in clauses 4.2.2.10 and 4.2.4.5.2).*

Where 2 of the load conditions above lead to similar brake test conditions according to relevant EN standards or normative documents, it is allowed to reduce the number of tests conditions from 3 to 2.

Description of the situation:

For the verification of the emergency brake performance calculation according to clause 4.2.4.5.2, the above-mentioned clause 6.2.3.8 of the TSI requires the tests to be carried out



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with at least two load conditions. This requirement is also applicable for vehicles without load-proportional braking.

In contrary to the above-mentioned TSI requirements, the appendix F.1.2 of the UIC 544-1 [2], for vehicles without load-proportional braking, requires a test to be carried out in "empty" load condition only if the mass difference between the "empty" and "normal" load conditions is less than 20 %.

For vehicles without load-proportional braking EN 16834, table 4, requires tests in the load conditions MVD, MND (according to EN 15663). Tests in maximum braking load is recommended if the difference between maximum braking load and normal MND is higher than 10 %.

Besides the testing requirements in chapter 6.2.3.8 of the TSI, the different load conditions must be considered in the stopping distance calculation (4.2.4.5.2) and the thermal simulation (4.2.4.5.4).

Note:

According to clause 4.2.4.5.2 (6), three load conditions must be considered in the brake distance calculation. Clause 4.2.4.5.2 (7) requires the verification of the calculation by tests, as detailed in clause 6.2.3.8. Clause 6.2.3.8 allows the applicant to reduce the number of test conditions from 3 to 2 if 2 of the load conditions lead to similar brake test conditions.

Thus, the "replacement" of a test scenario by simulation is not reasonable, since the simulation (= brake calculation) is already there and shall be verified by tests.

In general, the verification by tests is necessary because the load condition has an impact on the brake disc temperature and the thermal behaviour of the friction material, which is not sufficiently predictable without tests.

RFU PROPOSAL

- 1) The minimum number of load conditions required by TSI LOC&PAS cannot be reduced neither by means of alternative requirements from standards nor alternative solutions proposed by the Applicant.
- 2) In particular, TSI LOC&PAS does not allow the acceptance of tests in only one load condition.
- 3) The TSI does not permit replacement of such a test by simulation or calculation.

Note: the load condition has an impact on the brake disc temperature and therefore on the braking performance, which currently cannot be simulated or calculated in a dependable way.

THIS RFU WAS AGREED ON

PLENARY MEETING 065 – 23/06/2022



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THIS RFU ENTERS INTO FORCE ON

13/09/2022 (date of publication)

FROM THIS DATE ON THIS RFU CAN BE APPLIED INSTEAD OF THE PREVIOUS MANDATORY VERSION.

RFU APPLICATION IS MANDATORY STARTING FROM

13/11/2022 (2 months after date of publication)

AT THIS DATE ANY PREVIOUS VERSIONS OF THIS RFU WILL BE WITHDRAWN.

RFUS SHALL BE APPLIED BY ALL NOBOS. PLEASE REFER TO RFU-STR-702, CHAPTER 3 OF THE SECTION "DESCRIPTION AND BACKGROUND EXPLANATION", FOR THE LEGAL BASIS SUPPORTING THIS OBLIGATION.

ERA COMMENTS

PLE 065 – 23/06/2022: Comments to be provided and taken into account in issue 02.