Transmitted by the experts of Japan

Informal document GRBP-83-38
(83rd GRBP, 10-13 February 2026,
agenda item 5 (g))

Proposal to amend document GRBP/2025/27 (Proposal for a new UN Regulation on the uniform provisions concerning the approval of tyres regarding abrasion performance)

I. Proposal

Insert a new Annex title to Contents, to read:
"Annex 4 Procedure for Demonstrating Equivalence of Vehicle Test and Indoor Drum Test Facilities for Tyre Abrasion"

Insert a new paragraph 8.1. to Annex 1, to read:
"8.1. Abrasion index correction in Paragraph 3.3. of Annex 3 (Yes/No)[2]"

Insert a new Annex 4, to read:

"Annex 4

Procedure for Demonstrating Equivalence of Vehicle Test and Indoor Drum Test Facilities for Tyre Abrasion

1. Scope

1.1. This Annex sets out a procedure to demonstrate that the results of a tyre abrasion test carried out at a facility are equivalent to those obtained with other facilities. The aim is to ensure that, facilities yield equivalent abrasion performance results, so that approvals based on any facility or method remain comparable and mutually recognised.

1.2. The procedure provides a structured approach for evaluating facilities. It applies to both indoor drum test and vehicle test facilities.

1.3. Furthermore, this procedure establishes the methodology for determining the transfer function, which mathematically relates the results obtained from the indoor drum test method to those of the vehicle test method.

2. Definitions

2.1. "*Facility*" means a testing centre, carrying out either vehicle tests at a circuit or indoor drum tests.

2.2. "*Circuit*" means the specific test route on public roads selected for the execution of the vehicle test method in accordance with Annex 3.

2.3. "*Indoor Drum*" means the test machine and associated equipment used for the execution of the indoor drum test method in accordance with Annex 3.

2.4. "*Reference tyre*" means the Standard Reference Test Tyre (SRTT) specified in

the vehicle test method or indoor drum test method of Annex 3, used to normalize the abrasion level of the exercise tyres.

2.5. "*Circuit length*" means the specific length is made of one or several loops with satisfying minimum length in accordance with Paragraph 1.6.13.1. of Annex 3.

2.6. "*Longitudinal acceleration for each circuit length*" (measured in m/s^2) is the acceleration in the direction of vehicle movement for each circuit length. Longitudinal acceleration has a positive sign for speed increase and a negative sign for speed decrease (e.g. braking).

2.7. "*Lateral acceleration for each circuit length*" (measured in m/s^2) is the acceleration perpendicular to the direction of vehicle movement for each circuit length. Lateral acceleration has a positive sign when turning left in the direction of the vehicle movement. Lateral acceleration has a negative sign when turning right in the direction of the vehicle movement.

2.8. "*Transfer function*" means a linear relationship used to relate indoor drum test results to vehicle test results. The transfer function is expressed as:

$ALI_{vehicle} \approx ALI_{drumTF} = ALI_{drum} + a$ (SRTT Abrasion Level - 100),

where the coefficient a takes a value depending on SRTT abrasion level, $ALI_{vehicle}$ is the Abrasion Level Index of the candidate tyre that would be obtained using the vehicle test method in accordance with Annex 3, ALI_{drum} is the Abrasion Level Index obtained using the indoor drum test method, and ALI_{drumTF} is the approximation of $ALI_{vehicle}$ obtained through the applications of the transfer function;

3. Equivalence procedure outline

Equivalence of Test Results by Abrasion Level of Reference Tyre

This evidence procedure is to confirm that appropriate testing conditions are in place at each facility by checking the SRTT abrasion level and to verify the equivalence of abrasion levels between the two positions for a drum or between test vehicles for a convoy.

3.1. Indoor drum

Confirm that appropriate testing conditions are in place at each facility by checking SRTT abrasion level. Each facility shall define the specific conditions to identify the surface, 3rd body, and flow rate combination that achieves the appropriate SRTT abrasion level.

3.1.1. The facility shall use two SRTT17S tyres for this procedure. The facility shall conduct simultaneous test using two reference tyres mounted in two positions on a drum. All other test conditions, excluding the candidate tyre, shall be in accordance with Paragraph 2 of Annex 3.

3.1.2. The facility shall record the Abrasion Level of the two reference tyres. If the Abrasion Level of the reference tyres differs significantly, the facility shall check for abnormalities in the test condition settings and/or test condition results for each position, correct them, and perform the test procedure again.

3.1.3. If the abrasion level falls outside the reference tyre Abrasion Level range specified in Paragraph 2.4.2.3. of Annex 3, the facility shall modify the specific test conditions and conduct the test procedure again.

3.1.4. The facility shall record the powder delivery rate for each test cycle of the two positions. If the powder delivery rate for each test cycle falls outside the tolerance specified in Paragraph 2.4.4.1. of Annex 3, the facility shall modify the specific test conditions and conduct the test procedure again.

3.2. Circuit

Confirm that appropriate testing conditions are in place at each facility by checking SRTT abrasion level. Each facility shall define the specific conditions to identify vehicle toe/camber, etc. that achieves the appropriate SRTT abrasion level.

3.2.1. The facility shall use up to four SRTT17S tyres for this procedure. The facility shall conduct simultaneous test using up to four reference tyres mounted in each reference vehicle in a convoy. All other test conditions, excluding the candidate tyre, shall be in accordance with Paragraph 1 of Annex 3.

3.2.2. The facility shall record the Abrasion Level of the up to four reference tyres. If the Abrasion Level of the reference tyres differs significantly, the facility shall check for abnormalities in the test condition settings and/or test condition results for each test vehicle, correct them, and perform the test procedure again.

3.2.3. If the abrasion level falls outside the reference tyre Abrasion Level range specified in Paragraph 1.6.16. of Annex 3, the facility shall modify the specific test conditions and conduct the test procedure again.

3.2.4. The facility shall record standard deviation for both the longitudinal acceleration for each circuit length and lateral acceleration for each circuit length of up to the four reference vehicles in a convoy. If standard deviation either the longitudinal acceleration for each circuit length or lateral acceleration for each circuit length differs significantly in a convoy, the facility shall check for abnormalities in the test condition settings and/or test condition results for each reference vehicle in a convoy, correct them, and perform the test procedure again.

3.3. Abrasion Index correction

In case the indoor drum test in Annex 3 is conducted and if the abrasion level of the reference tyre is between 100 mg/km/t and 135 mg/km/t, the abrasion index obtained from the test result shall be corrected using the transfer function.

$ALI_{drumTF} = ALI_{drum} + 0.03x(\text{SRTT Abrasion Level} - 100)$”

II. Justification

- The TFTA has been discussing the introduction of test method equivalence as Annex 4 to the new UN Regulation. This proposal is to add Annex 4 to working document GRBP/2025/27 and informal document GRBP-83-32 proposed by TF TA.

- The equivalence of the indoor drum test method and the vehicle test method was confirmed through correlation validation test conducted from 2024 to 2025. However, due to the existence of outliers caused by test conditions, a test campaign is planned for 2026 with the aim of improving test accuracy.

- In parallel with the activities to improve test accuracy in 2026, an immediate improvement in test accuracy can be considered by utilizing the abrasion level evaluation of a reference tyre. The stability of test results for both test methods is established as a relative evaluation against a reference tyre with stable performance, and all tests are evaluated simultaneously with the reference tyre. Therefore, an approach based on the abrasion level of the reference tyre is technically reasonable and feasible.

- A method that technically mitigates the risk of outliers by using the SRTT abrasion level, which supports the Abrasion Index concept, is appropriate. Depending on SRTT abrasion level, there are three cases to enhance test method equivalence.

- Case 1. Abrasion level of SRTT above 135 mg/km/t :

  - This is not acceptable. Narrow range of SRTT abrasion level is to match the severity of indoor drum with vehicle test. This proposal is applied on informal document GRBP-83-32 Paragraph 2.4.2.3 of Annex 3.

- Case 2. Abrasion level of SRTT between 100 and 135 mg/km/t :

  - Abrasion index of indoor drum test is corrected using transfer function to reduce the risk of potential outliers in the higher severity range compared to vehicle test.

- Case 3. Abrasion level of SRTT below 100 mg/km/t :

  - Specific procedure is introduced to set appropriate test conditions for each facility using a reference tyre. The facility shall report test results using two SRTTs simultaneously at different positions on a drum.

  - SRTT abrasion level results allow Type Approval Authority to ensure that each facility is conducting the test properly.

  - Equivalence check by SRTTs are valid for both indoor drum test method and vehicle test method. In case of vehicle test, up to four SRTTs mounted on reference vehicles in a convoy are reported.