

Guidance document on the Procedure for Demonstrating Equivalence of Vehicle Test and Indoor Drum Test Facilities for Tyre Abrasion and Determining the Transfer Function for Indoor Drum Test Facilities [new]

1. Scope and Purpose

- 1.1 The purpose of this document is to provide guidance and best practices for the application of the equivalence procedure described in Annex 4 of UN Regulation No. [XX].
- 1.2 This document is intended to assist Type Approval Authorities, Technical Services, and test facilities in organizing and executing inter-facility equivalence exercises. It provides detailed technical recommendations on tyre selection, outlier analysis, and testing logistics to ensure robust and comparable results.
- 1.3 This document is for guidance only. It does not create additional regulatory requirements beyond those defined in the UN Regulation. In case of discrepancy, the text of the UN Regulation shall prevail.

2. Guidance on Paragraph 2.18 (Establishment of Generic Transfer Function)

- 2.1 For the purpose of this version of this Guidance Document, the Generic Transfer Function coefficient a is established as [1.5].
- 2.2 The generic value of a is subject to periodic review. It may be updated in future revisions of this Guidance Document as the number of equivalent drum facilities grows. Any such update will be based on the cumulative data from valid equivalence exercises, taking account of the calculation method described in paragraph 2 of this document.

3. Guidance on Paragraph 3 (Organisation)

- 3.1 General. Any inter-facility equivalence exercise should follow the 'Procedure outline' in paragraph 4 of Annex 4 and make use of this guidance document, requiring facilities to compare their results to others to ensure equivalence. In cases where the facility under assessment has competing interests with the participating facilities (e.g., competing tyre manufacturers), it is recommended to appoint an external independent entity (such as a Technical Service) to act as the Coordinating Body.
- 3.2 Role of the Coordinating Body. The Coordinating Body acts as the central administrator for the exercise. Its recommended responsibilities include:
 - Sourcing Tyres: Ensuring all exercise tyres are procured from a single production batch to minimize variation.
 - Anonymity: If multiple competitive facilities are participating, the Coordinating Body should anonymize the facility names in the final shared dataset (e.g., "Drum A", "Circuit B").

Timeline: Setting a strict testing window (e.g., three months) to minimize the impact of tyre aging or seasonal weather changes on the comparison.

Data Templates: Providing a standardized spreadsheet for reporting results to prevent transcription errors.

- 3.3 Witnessing of Tests. While it is not mandatory for the Coordinating Body to witness every test in the exercise, the following principles are recommended:

Facility Under Assessment: It is highly recommended that the Coordinating Body witnesses the testing at the facility under assessment. This ensures that the specific fixed parameters (sandpaper, flow rate, etc.) are correctly verified and recorded in the Equivalence Report.

Participating Facilities: Witnessing is generally not required for established participating facilities (e.g., Equivalent Circuits), provided they have a valid accreditation (e.g., ISO 17025) or a proven history of stability or quality controls.

Right to Audit: The Coordinating Body should reserve the right to witness tests or inspect raw data logs at any participating facility if data anomalies or outliers are detected during the analysis.

- 3.4 Guidance on "Initial Establishment" (Start-up Phase). Annex 4 designates the circuits that provided the data for the abrasion limits as the initial "Equivalent Circuits". This ensures that the regulatory stringency established during the legislative phase is transferred to the new type approval facilities. The primary objective of the initial exercises is to collect sufficient data to define Generic Transfer Function coefficient a mentioned in Annex 4, Paragraph 1.3.

- 3.5 Confidentiality and Participation Incentives. To encourage participation and protect intellectual property, the following principles should be applied:

Data Anonymity: The Coordinating Body should ensure that in any shared report or analysis, the identity of the participating facilities is anonymized (e.g., coded as Facility A, Facility B), except for the facility under assessment which receives its own specific report.

Firewall: Raw data should be submitted directly to the Coordinating Body and not shared between competing manufacturers.

Reciprocity: Facilities that benefit from the equivalence procedure (by obtaining Assessed or Equivalent status) are expected to participate as "Participating Facilities" in future exercises when requested, to maintain the robustness of the system.

- 3.6 To safeguard the statistical independence and robustness of the baseline values, participating facilities should be physically and operationally distinct. Specifically, circuits should not share common road sections or overlapping routes. Furthermore, to minimize systematic bias, it is recommended that participating facilities be managed by different entities.

- 3.7 Financial Arrangements: The financial aspects of the inter-facility equivalence exercise (e.g., purchase of tyres, shipping costs, testing fees for participating facilities) are not covered by the Regulation. It is the responsibility of the coordinating body and the participating facilities to establish a clear commercial agreement or cost-sharing model prior to the commencement of the exercise.

4. Guidance on Paragraph 4 (Equivalence procedure)

- 4.1 The equivalence status is considered permanent. It is recommended that each facility confirms equivalence through equivalence re-evaluations at intervals not exceeding [five] years. This ensures that machine drift, surface wear, or changes in local road conditions (for circuits) are detected and corrected.

The Type Approval Authority may request a re-evaluation of the equivalence of a facility.

- 4.2 For equivalence re-evaluations, if requested by the Type Approval Authority, the same transfer function shall be used by the drum under assessment.

5. Guidance on Paragraph 4.1.1 (Tyre Selection)

- 5.1 It is recommended that the selected tyres reflect a wide range of abrasion behaviour and cover both normal and 3PMSF categories. The ratio of normal to 3PMSF tyres shall be between 1:2 and 2:1. The set should include at least:

- One normal tyre and one 3PMSF tyre with low expected ALI [<0.8];
- One normal tyre and one 3PMSF tyre with medium expected ALI [between 0.8 and 1.2];
- One normal tyre and one 3PMSF tyre with high expected ALI [>1.2].

The equivalence of a facility designed for testing only normal or 3PMSF tyres shall be restricted to the corresponding tyre category.

It is recommended that the range of ALI values be >0.5 .

If the inter-facility equivalence exercise is a re-evaluation of the facility's equivalence, at least [four] exercise tyres should be different from those used in the previous cycle of the candidate facility to prevent reliance on a single design. It is recommended that each exercise tyre be manufactured in a single production batch and distributed to each participating facility. The exercise tyres should be stored in accordance with the ISO 2230 standard or the specific storage prescriptions defined for the Standard Reference Test Tyre (SRTT) in the UN Regulation [XX].

6. Guidance on Paragraph 4.1.2 (Facility Selection)

- 6.1 If the inter-facility equivalence exercise is a periodic confirmation of the facility's equivalence, at least [one] of the facilities used for comparison should be different from those selected in the previous exercise of the facility under assessment.

7. Guidance on Paragraph 4.2.1 (Testing Conditions)

- 7.1 For the vehicle test method, it is recommended that the average test temperature be 3 °C above the lower bound and 3°C below the upper bound of the required temperature range.

8. Guidance on Paragraph 4.2.4 (Outlier Handling)

- 8.1 It is recommended to communicate excluded results to the participating facilities. Facilities whose results are excluded as outliers should investigate the reasons and implement corrective actions. It is allowed to re-test the excluded tyre, but it is not mandatory. Exclusion should not retroactively invalidate the facility's previous approvals, nor should it result in the facility 'losing' equivalence.

9. Guidance on Paragraph 4.3.4 (Fixed Drum Parameters)

- 9.1 To ensure the validity of the transfer function, the drum facility should maintain the parameters used during the equivalence exercise within the following tolerances:

Flow Rate: The average flow rate during official testing should be within [\pm 5%] of the average flow rate recorded during the equivalence exercise.

Drum Surface: The surface texture material (e.g., sandpaper sheet) should be from the same manufacturer and specification (grit size) as used during equivalence. If the supplier changes, a reduced equivalence check (e.g., with 2 tyres) is recommended.

Powder Distribution: The hardware configuration (nozzle distance, angle, and pulsing mechanism) should not be modified. Maintenance that restores the original condition is permitted.