

# **CIRCULAR 35/03 - 2 – 1**

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## **SELECTION OF TEST VEHICLES**

### **1. INTRODUCTION**

1.1 This circular should be read in conjunction with circular 0-2-11 "General Procedures for Selection of Vehicles and Components for ADR Compliance Testing" containing requirements applicable to all ADRs, as well as Section 7.14 of ADR 35/03 (Alternative Procedures). This circular is applicable to all vehicles certifying to ADR 35/03.

1.2 The intention of the criteria in this circular is to reduce the number of vehicle specifications required to be tested. This circular details the criteria to be considered in selecting the variants of a vehicle model to be tested. The Administrator will usually accept tests conducted in accordance with the criteria as having demonstrated compliance for all variants in the model range. Additional tests may be required for combinations of characteristics not anticipated in this circular.

1.3 The Administrator will consider requests for further reductions in the number of tests than established by criteria in this circular on receipt of documented evidence that if tested, the braking test results of the untested vehicles would not result in a less favourable result compared to the tested vehicle. The untested vehicle evidence may be simulated or calculated with any such simulations or calculations being traceable to similar comparisons between tested vehicles.

1.4 It remains the responsibility of the vehicle manufacturer to ensure that every vehicle to which an identification plate is affixed complies with ADR 35/03 as applicable.

### **2. SELECTION REQUIREMENTS FOR BRAKING SYSTEMS**

#### **Grouping of Braking Systems**

2.1 Each unique braking system must be tested. To be considered as the same unique braking system, systems must have a combination of components that have the same physical (material or metallurgical), functional and dimensional properties. Any variation of the components of a braking system will constitute a different unique braking system except for:

- 2.1.1 length, diameter, material or routing of hydraulic, vacuum or air exhaust lines, or electrical wiring included in the system;
- 2.1.2 location of valves, fittings or other devices within a hydraulic or vacuum line;
- 2.1.3 Routing of air pressure lines included in the system.

## **Grouping of Vehicle Variants**

2.2 It is considered that an untested vehicle variant, with the same unique braking system as a tested vehicle variant, will not require testing if when compared to the tested vehicle it:

2.2.1 has the same calibration of any ECU controlling the braking or suspension systems.

*Note: For vehicles types having a complete chassis control system with multiple functions (e.g. ABS, TCS, ESC etc.) within the main calibration: If a manufacturer can demonstrate that a change in a calibration function such as TCS or ESC will not alter the normal braking performance, the calibrations shall be considered the same.*

2.2.2 has the same configuration of axles;

2.2.3 where applicable, has an equal or lower unbraked trailer mass;

2.2.4 has tyres that are smaller, the same or no more than 2% greater in diameter;

2.2.5 has tyres of the same or greater section width;

2.2.6 has greater or equal brake cooling airflow;

2.2.7 has no higher a road speed per 1,000 rpm for the gear ratio required for the Service Brake Fade Test unless the tested vehicle was fitted with an automatic transmission such that negligible engine braking is provided (e.g. a system with a fluid coupling torque converter);

2.2.8 has no lower Lightly Loaded Test Mass (for tests conducted at the Lightly Loaded Test Mass);

2.2.9 for vehicles without ABS or a load sensing variable proportioning system:

2.2.9.1 has no less of the proportion of the unladen mass on the rear wheels;

2.2.9.2 has no shorter wheelbase length.

2.2.10 has no greater Maximum Loaded Test Mass (for tests conducted at the Maximum Loaded Test Mass).

*Note: Where it is not possible to select from a range of vehicle variants, a single test vehicle that satisfies criteria 2.2.8 and 2.2.10, the manufacturer may choose a test vehicle that does not meet criteria 2.2.8 and 2.2.9.2 provided that the wheelbase of the selected vehicle does not exceed the shortest available wheelbase by more than 15%.*

### **Full Testing of Vehicle Variants**

2.3 Vehicles should be selected for testing purposes in accordance with the following criteria:

2.3.1 Where the maximum laden vehicle speeds of all the vehicles in the range are less than 100 km/h, at least one test vehicle shall have the power train giving the highest maximum laden vehicle speed of all vehicles within the range.

2.3.2 Where the maximum laden vehicle speed of any vehicle in the range is 100km/h or greater, at least one test vehicle shall have a power train giving a maximum laden vehicle speed of 100 km/h or greater.

2.3.3 Where the maximum interval between brake applications specified for the service brake fade test cannot be maintained by any vehicle within the range, at least one test vehicle shall have a power train which most nearly permits the specified maximum interval to be maintained.

2.3.4 Where the maximum interval between applications specified for the service brake fade test can be maintained by one or more vehicles within the range, at least one test vehicle shall have a power train which gives the acceleration which maintains the maximum interval between brake applications specified in Section 7.9.

2.4 For static actuating time and energy reservoir recovery tests, the untested vehicle (or installation) shall when compared to the tested vehicle:

2.4.1 have no longer length of brake pipe;

2.4.2 have no smaller an internal diameter of the corresponding brake pipes;

2.4.3 have no lower a rating of the brake energy generating device (i.e. compressor);

2.4.4 have no lower capacity of the energy reservoir

### **3. SELECTION REQUIREMENTS FOR ELECTRONIC STABILITY CONTROL (ECS) SYSTEMS**

#### **Grouping of Electronic Stability Control (ESC) system variants**

3.1 Each unique ESC system shall be tested. To be considered the same ESC system, systems shall have the same active components (e.g. sensors, ECU, actuation device (i.e. ABS unit), and brake type/combination (e.g. 4 wheel discs or disc/drum etc.).

#### **Grouping of Vehicle Variants**

3.2 Vehicle variants sharing the same ESC system (as defined in paragraph 3.1) shall be grouped for selection of testing of the ESC system. Grouped variants shall have the same;

3.2.1 suspension type (e.g. McPherson strut, wishbones, live axle, IRS, etc.), design and configuration;

3.2.2 drive configuration (i.e. front, rear or all-wheel drive);

*Note: "All-wheel drive" refers to variants where this drive configuration is designed to be used during normal high speed driving conditions (i.e. does not include variants where selection of this mode is intended only for off-road, low speed use).*

3.2.3 wheelbase (+/- 5%).

### **Selection of Variant/s for Testing**

3.3 The least dynamically competent variant of any group of variants sharing an ESC system shall be tested. In determining the least dynamically competent (see note below) vehicle variant, manufacturers should consider the following criteria:

*Note: "Dynamically Competent" describes the handling behaviour of a vehicle as an attribute when tested to the dynamic ESC requirements of ADR 35/03. A vehicle's dynamic competence is relative to the level of assistance and when (in relation to the rate of yaw) that the ESC system will be required to intervene to assist the driver to maintain the intended/steered direction of a vehicle (i.e. the **least** Dynamically Competent vehicle will require earlier and/or greater intervention).*

3.3.1 ride height (i.e. Centre of gravity);

3.3.2 suspension settings (e.g. Spring, sway bar, shock absorber rates);

3.3.3 tyre specifications (i.e. Rim diameter, tyre width, profile and diameter);

3.3.4 overall mass and mass distribution (including polar moment of inertia);

*Note: Where a manufacturer is unable to determine a single variant that is the least dynamically competent variant from a group of vehicle variants, multiple variants may be required to be tested (see also paragraph 5.2).*

## **4. PARTIAL TESTING OF VEHICLE VARIANTS**

4.1 A previously tested vehicle variant fitted with a variation of a unique braking system may be tested only to the tests that are relevant to the variation in the braking system. The conditions where a vehicle may be subject to a partial test are described in the paragraphs below:

4.1.1 the parking brake system shall be tested to ADR 35/03, Section 7.11 or ECE R13 Clause 2.3 as applicable;

4.1.2 the brake power or assist unit shall be tested to ADR 35/03 Sections 7.6, 7.7 & 7.8 or ECE R13 Annex 7 as applicable;

4.1.3 ABS system shall be tested to ADR 35/03, Appendix 1 or ECE R13, Annex 13 as applicable;

*Note: The manufacturer shall be able to demonstrate that any change to the ABS system's active components will not adversely affect any previous normal braking or ESC test.*

4.1.4 variable (load) proportioning system or the pressure proportioning control system shall be tested to ADR 35/03 Sections 7.4, 7.12 & 7.13 or ECE R13 Annex 4 Clause 2.2 (Unladen) and Annex 6;

4.1.5 the ESC system shall be tested to ADR 35/03 Appendix 2, ECE R13 Annex 21 or GTR 8 as applicable;

*Note: The manufacturer shall be able to demonstrate that any change to the ESC system's active components will not adversely affect any previous braking test/s (See note, Paragraph 3.1).*

- 4.1.6 the air pressure actuation system as described in paragraph 2.4 above shall be tested to ADR 35/03 Section 7.12 and 7.13 or ECE R13 Annex 6 as applicable.

*Note: The varied design shall be assigned its own unique brake system identifier. For the variations requiring retesting described in Paragraphs 4.1.3, 4.1.4 and 4.1.5 above, the relevant SE form shall contain the results of all in motion tests conducted relevant to the base braking system, not just those conducted resulting from the design variation. The test report for the varied braking system referenced on the SE form must reference the original full test report. Extension sheets attached to the original test report shall reference and collate the additional tests.*

## **5. ALTERNATIVES TO PRACTICAL TESTING (ESC SYSTEMS)**

5.1 If simulation (ADR 35/02 Appendix 2 – Attachments 1 & 2, GTR 8 or ECE R13 Annex 21) is used to demonstrate compliance, the manufacturer shall hold the original practical test report, the validating simulation on an identically specified vehicle (paragraphs 3.1 and 3.2) and the simulation results of the variant for which compliance is being demonstrated. The simulation shall be performed using the same simulator and the test report must reference the validation tests.

5.2 A manufacturer may elect to perform (and document) an assessment of an additional variant or group of variants sharing the criteria in paragraphs 3.1 and 3.2, and determine additional testing is not required (see paragraph 3.3). The manufacturer shall hold documentary evidence of this assessment.

## **6. FLEET SELECTION FORM (SFVBS) REQUIREMENTS**

6.1 Any variants shown on the SFVBS form that require demonstration of compliance to the ESC requirements shall be shown on the SFVBS form as “T”, “S” or “NT”:

6.1.1 variants subjected to practical testing shall be shown as tested “T”;

6.1.2 variants demonstrating compliance by simulation shall be shown as “S”;

6.1.3 Variants not requiring demonstration of compliance to the ESC requirements by practical testing or simulation shall be shown as “NT” (see Paragraph 5.2).

## **7. ALTERNATIVE STANDARDS**

7.1 An untested variant which is listed in an appropriate ECE approval document (to one of the ECE regulations listed as an alternative standard in the ADR) may be certified without the selection criteria in the circular being applied. All variants to be covered in the application shall be included on the fleet selection form. If all variants listed on the SF form are listed in an ECE approval document the tested/untested status is to be recorded as “ECE-A”

7.2 An untested variant that is not listed in an appropriate ECE approval document (to one of the ECE regulations listed as an alternative standard in the ADR) may be certified on the basis of comparison to a vehicle variant tested in accordance with compliance to the technical requirements of an appropriate ECE regulation if:

7.2.1 the tested variant/s is listed in an appropriate ECE approval document and;

- 7.2.2 the untested variant/s, when compared to the tested variant, meets the criteria of this circular (Paragraph 2).
- 7.3 In this case, the variant/s tested to the ECE regulation and included on the ECE approval are to show the tested/untested status as “ECE - Tested”. The variants not tested to the ECE regulation but included in the ECE approval are to show the tested/untested status as “ECE - Approved” and the variants not tested to the ECE regulation and not included on the ECE approval are to show the tested/untested status as “Untested”. All variants to be covered in the application must be included on the fleet selection form. A variant marked as Untested may only be compared with a relevant variant which is either “ECE - Tested” or “Tested”.
- 7.4 A vehicle variant fitted with a variation of a unique braking system (under the conditions set out in Paragraph 4) may be certified on the basis of comparison to a vehicle variant shown as “ECE – Tested” on the SF form. In this case, the variant shall be listed on the SF form and shown as “Tested– Partial”.