

# CIRCULAR 83/00 - 2 - 1

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## SELECTION OF TEST VEHICLES

### INTRODUCTION

1. This Circular should be read in conjunction with the General Circular 0-2-11 "*General Procedures for Selection of Vehicles and Components for ADR Compliance Testing*" containing requirements applicable to all ADRs.
2. The intention of the criteria in this circular is to select the "worst case" - i.e. to test the vehicle(s) which would produce the greatest external noise when tested in accordance with the ADR. In the test for vehicles in motion this is expected to be the vehicle(s) which will accelerate most rapidly over the test distance and which will have the highest engine speed at approach to, within, or departure from, the test area. Additional tests may be required for combinations of characteristics not anticipated in this circular.

The Administrator will consider requests for further reductions in the number of tests on receipt of documented evidence that the external noise of the untested vehicles will not exceed that of the tested vehicle. That documented evidence may include simulated or calculated external noise results for the untested vehicle with any such simulations or calculations being traceable to similar comparisons between tested vehicles.

3. It remains the responsibility of the vehicle manufacturer to ensure that every vehicle supplied to the Australian market complies with ADR 83/00.

### SELECTION REQUIREMENTS - VEHICLES IN MOTION

4. The Administrator will accept a test on one vehicle as representative of another for the purposes of demonstrating compliance with the requirements for vehicles in motion, provided the following criteria are met:

When compared with the untested vehicles, the test vehicle shall have:

- a) The same type of device or system that converts stored energy into mechanical energy (i.e., internal combustion engine, electric motor, hybrid internal combustion engine / electric motor).

Note: In the case where the vehicle is equipped with only an electric motor for propulsion, the requirements of Sections 4 (b), (c) and (d) are not applicable.

- b) an engine of the same "engine family", i.e., identical with respect to:
  - i. the nominal bore centre to centre dimensions;
  - ii. the nominal dimension from the centreline of the camshaft(s) to the centreline of the crankshaft;
  - iii. the nominal dimensions from the centreline of the crankshaft to the top of the cylinder block where the cylinder head is mounted;



- iv. the number of cylinders, their configuration and the type of cooling system (IL6, 90° V8 etc., air cooled or water cooled);
- v. capacity (no more than 10% smaller, larger to an unlimited degree);
- vi. the number, configuration (i.e. method of timing, actuation, location and geometry) and size of the intake and exhaust valves (within a 4 mm range on the valve head diameter);

**Note:** Should an engine family as defined in Section 4 (b) have a variant that differs only in being equipped with a device that varies the valve timing, lift or duration, then the untested variants shall be considered tested providing the vehicle tested produces the same or higher engine and road speed in the overall gear ratio giving the maximum noise (during the time that the vehicle is travelling between line AA and BB as defined in section 4 (g)) than would be produced by the untested vehicle if it were tested in the same overall gear ratio.

- vii. the method of air aspiration (e.g., natural or forced, intercooled or non-intercooled);
  - viii. the type of combustion cycle;
  - ix. the type of ignition (i.e., spark ignition or compression ignition);
  - x. The method of fuel intake. If by carburation, there shall be no variation in the number of carburetors, number of barrels or principle of operation. If by fuel injection, there shall be no variation manner of injection (i.e., indirect injection into the inlet tract or pre-combustion chamber, or directly into the combustion chamber).
- c) the same engine air cleaning system i.e. identical with respect to:
- i. the location and design characteristics of the air intake and cleaner assembly;
  - ii. the size and construction of the air filter element(s).
- d) the same exhaust system i.e. identical with respect to:
- i. exhaust manifold(s), heat shields and/or shrouds;
  - ii. number and location of major exhaust components;
  - iii. the muffler(s);
  - iv. catalytic converter characteristics other than those (e.g. Platinum loading) which have no effect on noise;
  - v. the resonator(s);
  - vi. nominal diameters of exhaust pipe(s) (measured at the entry and exit of the catalytic converter(s), resonators(s) and muffler(s));
  - vii. place and direction of exhaust outlet(s);
  - viii. The same or shorter length of exhaust pipe(s).
- e) the same engine compartment construction, i.e., identical with respect to:
- i. construction material;
  - ii. the envelope shape and size;
  - iii. The same or lower level of sound proofing of the engine and the engine compartment.
- f) The same or greater net engine power, maximum rated engine speed and (if applicable) governed engine speed.



Note: A vehicle with a greater net engine power may only be used as a representative test vehicle for another variant with a lower net engine power if the test vehicle falls within the same noise limit band as the untested vehicle and the lowest specified gear for the test vehicle is the same as for the untested vehicle.

Requirements 4(b)(v) and 4 (f) need not be met for vehicles in motion if the test vehicle, when tested in the overall gear ratio giving the maximum noise, produces the same or higher engine and road speed when the rear of the vehicle passes BB than would be produced by a test vehicle selected in accordance with the above criterion.

g) a drive line (gearbox, differential and tyre size combination) which:

in the case of all vehicle categories except for MD, ME, NB and NC equipped with a manual gearbox in the lowest specified test gear:

provides the same or higher engine speed at line AA in the case of vehicles where the approach speeds at line AA is 50 km/h;

Or

provides the same or lower vehicle speed at line AA in the case of vehicles where the approach speed at line AA is less than 50 km/h and engine speed is 3/4 of that at maximum power.

In the case of vehicle categories MD, ME, NB and NC equipped with a manual gearbox:

provides an overall ratio X (of all possible combinations available) such that no untested vehicle would have a higher engine speed when the rear of the vehicle passes line BB when tested in the gear ratio X applicable to the relevant vehicle.

For all vehicle categories fitted with an automatic gearbox:

provides the highest engine speed at any moment between the times that the front of the test vehicle crosses line AA and the time that the rear of the test vehicle crosses line BB.

Note: If the vehicle tested is equipped with an automatic transmission fitted with a device selectable by the driver to alter the characteristics of the change pattern or points of the transmission, this device shall be set in the position that results in the highest engine speed during the test. This requirement need not be met if the vehicle is being tested using the method described for transmissions with a manual selector and this action causes the transmission to change down into first gear during the test.

h) not more than 10% greater unladen mass;

Note: For MA, MB, MC, NA and all L categories: Requirement 4(h) need not be met if the test vehicle selected in accordance with criterion 4 (g) produces the same or higher engine speed when the rear of the vehicle passes BB than would be produced by a test vehicle selected in accordance with 4(h).

For categories MD, ME, NB and NC: Requirement 4(h) need not be met if, when in the overall gear ratio X, as the rear of the test vehicle passes BB the vehicle is travelling at



an equal or higher speed than would be produced by a vehicle selected in accordance with 4(h).

- i) a gross vehicle mass that will group the tested and untested vehicles into the same noise limit band;
- j) the same or greater number of axles, driven axles and road wheels;

Note: If the vehicle tested is equipped with a device in the driveline that enables the driver to engage or disengage drive to an axle(s), the vehicle must be tested with the axle(s) engaged. This requirement need only be met in the case where the recommendations of the manufacturer permits operation of the vehicle with all axle(s) engaged on paved surfaces at the test speeds required in this test.

- k) vehicle design features that are intended for the same purpose (i.e, off-road or on road)

Note: Requirement 4(k) need not be met in the case of those vehicles where the noise limit is the same for vehicles designed for either purpose (i.e. All L category vehicles, NA or MD category vehicles where the GVM  $\leq$  2000 kg) providing the vehicle tested is the variant designed for off-road use.

- l) tyres fitted that are designed for the same purpose (i.e, off-road, hybrid, paved road use).
- m) an identical noise limit as stated in the relevant clause of the ADR.

#### **ADDITIONAL SELECTION REQUIREMENTS FOR VEHICLES OF L CATEGORY**

- n) the same method of final drive (i.e., chain, belt, direct, shaft);
- o) A fairing that covers the smallest portion of the engine and exhaust system or has no fairing at all.

#### **ADDITIONAL SELECTION REQUIREMENTS FOR VEHICLES OF CATEGORIES M and N**

- p) the same engine cooling system, i.e. identical with respect to:
  - i. fan(s);
  - ii. radiator shrouds;
  - iii. having the same or larger area of radiator air inlet aperture.

#### **AUXILLARY EQUIPMENT**

- q) the same noise emitting devices which are not necessary for propulsion, but which are used in normal service on the road and, when operated in accordance with the recommendations of the manufacturer, would be in operation during the test.

For example:

- i. engine brakes;
- ii. air conditioners;
- iii. thermostatic fans with manual override.

Note: *Air conditioners must be set to operate at their maximum cooling capacity or where controlled by internal temperature setting, that setting must be at least 10 degrees Celsius below the ambient temperature.*



### **SELECTION REQUIREMENTS - STATIONARY VEHICLES**

5. The Administrator will accept a test on one vehicle as representative of another for the purposes of demonstrating compliance with the requirements for stationary vehicles provided:
  - i. the criteria of Para 4 (a), (b), (c) and (d) are met by the test vehicle;
  - ii. That the maximum achievable engine speeds in neutral is the same in the untested vehicle as the tested vehicle.

*Note: Where a vehicle is equipped with an automatic transmission that has a "Neutral" and a "Park" position for the gear selector lever, "neutral" as referred to in the clause above shall be the "Park" position.*

### **SELECTION REQUIREMENTS – M AND N CATEGORY VEHICLES EQUIPPED WITH COMPRESSED AIR**

6. Where a vehicle type has variations of the compressed air system that services the braking system, the test vehicle shall be equipped with the system specification that will result in the highest noise level reading.

### **ALTERNATIVE STANDARDS**

7. An untested vehicle 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 this Circular being applied. All variants to be covered in the application must be included on the Fleet Selection (SF) 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 Approved"
8. An untested vehicle variant which 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 and listed in an appropriate ECE approval document (to one of the ECE Regulations listed as an alternative standard in the ADR) if the untested vehicle variant(s), when compared to the tested variant, has been selected in accordance with this Circular. 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 (SF) form. A variant marked as Untested may only be compared with a relevant variant which is either "ECE - Tested" or "Tested".