Driver & Vehicle Standards Agency

WP180 Emissions Testing Programme 2025-26

Contract Reference: K28022801b

Schedule 2b – Specification
for
Lot 2 - Light Duty Vehicles PHEV (OVC-HEV) M1/N1

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1. Introduction

This specification is for the provision of Lot 2 - Light Duty Vehicles PHEV (OVC-HEV) M1/N1. This specification (Schedule 2b) is to be read in conjunction with the over-arching Specification (Schedule 2) for the Vehicle Emissions Testing Programme 2025-26.

2. Vehicle Selection and Provision

The programme is expected to deliver a minimum of 6 vehicles in this programme which will be PHEV passenger cars/Light Vans with engines certified as meeting Euro 6 requirements, costs to be based on this figure. However, there may be scope to do additional vehicles if there is time available after the initial vehicles are completed. These vehicles will be provided to the laboratory by the DVSA.

The exact vehicles will be decided once programme is awarded and underway dependent on availability.

All provided vehicles will be subject to the preconditioning checks as set out within the common specification (Schedule 2).

3. Test specification for Off-Vehicle Charging Hybrid Electric Vehicles (OVC-HEVs)

The laboratory is requested to provide a suite of testing that covers both regulatory Type Approval tests plus additional testing to evaluate overall emission and real world performance. Regulatory tests shall be conducted as per EU 2017/1151 (as amended), GB 715/2007 and UN R83.08, as applicable for the given vehicle. The test portfolio should include:

a) A Type 1 test in charge-sustaining condition*
b) A Type 1 charge-depleting test sequence*
c) In the event that a vehicle fails either laboratory type 1 test, up to a further two laboratory) type 1 tests will be required to be undertaken.
d) A Type 1 test in charge sustaining condition with the vehicle soaked and test conducted at 0 °C, referred to as the “laboratory cold test”
e) A Type 1 test in charge depleting condition with the vehicle soaked and test conducted at 0 °C, referred to as the “laboratory cold test”
f) An RDE test, referred to as the “RDE standard test” (charge-sustaining)
g) An RDE test with a fully charged HV battery (charge-depleting).
h) Two additional lab based RDE (to meet regulation criteria as per the RDE road drive) tests completed “back to back” with exact requirements provided in the test request.
i) Additional testing if required.

* Type 1 charge-sustaining and charge-depleting test results shall be used for calculating and reporting the combined weighted test results as per EU 2017/1151 (as amended), GB 715/2007

and UN R83.08. R154.03 for OVC-HEVs, With the final combined weighted resulted calculated to the same standard as the vehicles type approved figures.

For every Type 1 test**,** the Supplier shall analyse exhaust gases by collecting samples in bags (which will be used for the purposes of calculating the final test results), as well as measuring tailpipe exhaust gases continuously over the cycle (which will be used for detailed investigations, as required). The results of both analysis methods shall be made available to DVSA. A single report with the charge sustain and charge deplete together with the weighted results.

It is required for labs to make appropriate REESS measurements across the test cycles for all vehicles, and instructions will be provided as appropriate, following guidance from vehicle manufacturers. It is important that the instruction are checked as soon as possible when the vehicle is received, the supplier may be asked to support a meeting with the manufacturer to confirm the setting.

4. Specific Test Requirements – Type 1 tests

The Type 1 test procedure as given in EU 2017/1151, GB 715/2007 and UN R154.03 shall be followed, for the applicable vehicle type, under the correct laboratory conditions, for every test vehicle. For vehicles equipped with a manual shift transmission, the 'gear shift schedule' to be used for the test shall be provided as used at type approval, and used for the purposes of the preconditioning and Type 1 tests.

Vehicles shall always be tested in the predominant, 'key-on' default mode, unless otherwise specified by DVSA.

Unless otherwise agreed by DVSA the vehicle shall be tested under the same chassis dynamometer configuration as at type-approval. If the vehicle has a dyno or coastdown mode, information on how to enable these modes will be communicated by DVSA.

Transferring road load to a chassis dynamometer shall be done using the Fixed or Iterative methods as given in paragraph 8. of Sub-Annex 4 of Annex XXI. The dynamometer load coefficients generated from this are valid for use in preconditioning, Type 1 and PEMS validation tests, for up to one week. Otherwise, this activity must be repeated after the Type 1 test to confirm the generated dynamometer loads are still valid.

Test vehicle preconditioning shall follow the applicable the regulation requirements (paragraph 2.6. of Sub-Annex 6 of Annex XXI)

- Vehicle REESSs shall be fully charged unless otherwise specified.
- One applicable Type 1shall be driven. Further WLTCs may be driven to stabilise emissions control systems, as appropriate.
- Test vehicle shall then be put into a dedicated soak area for 6 – 36 hours at 23 ± 3°C. Vehicle shall not be placed on charge again before the Type 1 test. Additionally, keys must be kept away from the test vehicle to reduce the possibility of battery charge depletion.

Type 1 test requirements (as given in Annex XXI)

a) Applicable Type 1 shall be driven (i.e. Class 1, 2, 3a or 3b) as part of the sequence options permitted for OVC-HEV vehicles as per Sub-Annex 8 of Annex XXI (see figure 1). Therefore, it is possible to follow one of 3 sequences to complete the regulatory lab tests;
   i. Option 1 + Option 2
   ii. Option 3
   iii. Option 4

   Consideration shall be given to include a road load check at the appropriate point in the sequence, as to not influence the following step by any significant change in vehicle state of charge during the road load check.
b) The emissions required to be measured and recorded for each Type 1 test are limited to the pollutants applicable to the vehicle under test, as per the regulation it is approved to. CO2 shall also be measured, and fuel consumption shall be reported. Per phase and per cycle values shall be recorded.
c) Speed trace tolerances requirements shall be adhered to, and IWR and RMSSE drive trace indices limits shall also be satisfied. Otherwise, the test is deemed invalid and shall be repeated. These results shall be reported to DVSA
d) Results showing raw data as well as Ki and DF corrections are required for all emissions test results.
e) RCB Corrections shall be applied to the results where applicable – K_{CO2} factors will be supplied.
f) Upon completion of the laboratory standard test a roadload check / coastdown should be completed and recorded to verify the dynamometer load coefficients are unchanged and included with the final test data.

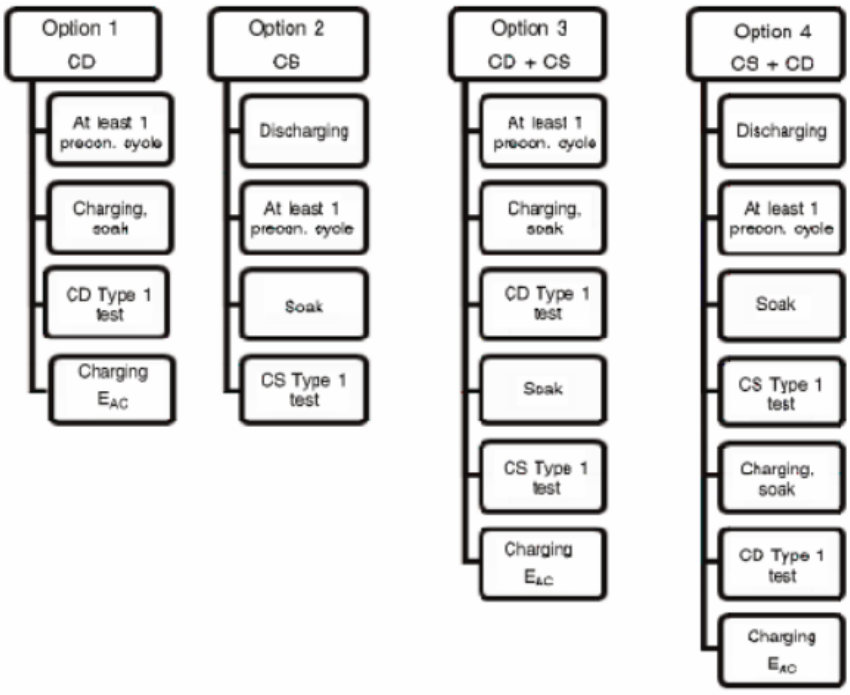

Figure 1 - Possible test sequences for OVC-HEV testing

5. Specific Test Requirements – Type 1 "laboratory cold tests"

To follow the general test requirements for laboratory standard test as shown above, the laboratory cold tests (charge deplete and charge sustain) shall include a soak period of 6 – 36 hours at 0 ± 3°C.

The Type 1 test should be executed at a chamber temperature of 0 ± 3°C.

It is not necessary to perform a separate road load match for the laboratory cold tests conducted at 0°C. Instead, the road load f_2 term and hence dynamometer C coefficient shall be corrected, using an approach derived from EU 2017/1151 (as amended), GB 715/2007 and UN R154.03 and the low temperature Type 6 test in UNECE GTR 15. Correction procedure shall be as below (Extract from UNECE GTR 15 Amendment 6, Annex 13);

The chassis dynamometer setting A^*_d and B^*_d shall be the same as those determined for the test at 23 °C, as specified in paragraphs 8.1.4. or 8.2.3.3. of Annex 4. The chassis dynamometer coefficient $C^*_{d\text{-}Tlow}$ shall be adapted in accordance with the following equation:

$$C^*_{d\text{-}Tlow} = C^*_d + (f_{2\text{-}Tlow} - f_2)$$

and

$$f_{2\text{-}TLow} = f_2 * (T_0 + 273)/(T_{low} + 273)$$

Where:

C^*_d is the dynamometer coefficient for the vehicle derived at 23 °C

f_2 is the second order road load coefficient, at reference conditions, $N/(km/h)^2$;

T_0 is the road load reference temperature as specified in paragraph 3.2.10. of this UN GTR, C,

Where reference temperature T_0 is 20°C and T_{low} shall be the applicable test temperature, 0°C.

6. PEMS and RDE Test Requirements

PEMS equipment is to be installed prior to lab testing and correlated during the lab testing of each vehicle.

The RDE preparation, test and post-processing procedures, as given in EU 2017/1151 (as amended), GB 715/2007 and UN R168.0, shall be followed in their entirety and documented, for the applicable vehicle type, as shown below:

a) Test procedure for vehicle emissions testing with a Portable Emissions Measurement System (PEMS)
b) Specifications and calibration of PEMS components and signals
c) Validation of PEMS and non-traceable exhaust mass flow rate
d) Determination of emissions
e) Verification of overall trip dynamics using the moving averaging window method (as applicable)

The vehicle should be driven dynamically targeting high Vapos 90%
For urban section Vapos must be between 80 and 95
For rural section Vapos must be between 75 and 90
For highway section Vapos must be between 65 and 85
Vehicle mass at the start of the test should be at 90%payload (DVSA will supply the targeted weight).

F) Using the appropriate RDE package and conformity factors. Final results should be presented with and without Ki

Standard RDE testing shall take place on public roads (apart from the PEMS validation), and the measured exhaust emissions shall include NO_x, PN and CO (mg/km) and CO_2 (g/km) as a minimum. All utilised test equipment described in EU 2017/1151 (as amended), GB 715/2007 and UN R168.0, shall possess a valid calibration certificate, which shall be provided to DVSA to cover any conducted testing. Vehicles shall always be tested in the predominant, 'key-on' default mode, unless otherwise specified by DVSA. For all Hybrid Electric Vehicles the High Voltage (HV) Battery State of Charge (SoC) should be recorded pre and post test, and if possible recorded throughout the test via OBD measurement. HV battery voltage and current shall also be recorded via OBD measurement and/or physical measurement throughout testing where possible.

RDE preconditioning drives may take place on a chassis dynamometer (with the correct road-loads applied) or on-road, as long as all other regulatory requirements are met.

The test shall be conducted in the prevailing ambient conditions; however, it should not be conducted in adverse conditions. If the below conditions exist, the test should be delayed until suitable conditions prevail;

- Ambient temperature ≤0°C or ≥30°C
- Heavy rain, snow or excessive standing water

Unless otherwise specified in DVSA test request, the target test mass of the vehicle (with the driver, passenger(s), and the PEMS installed), shall be the same as the mass of the vehicle as received with a driver and passenger, without the PEMS installed ± 5%. This is to provide an allowance for the different fuel tank levels and different driver and passenger masses. The vehicle shall be weighed prior to RDE test and the test mass shall be recorded.

For RDE tests, winter tyres may be used if road/weather conditions deem them to be mandatory for safety reasons (and testing cannot be completed otherwise). However, summer (or all season) tyres are preferred in all other cases. All tyres used shall be in the vehicle's approved list.

All PEMS pre and post calibration gas analyser checks shall be recorded and included in all reports delivered to DVSA.

As with the laboratory test the vehicle should be tested using reference fuel. The vehicle should undergo a series of pre-test checks, with minimum requirements as follows;

a. Tyre pressure
b. Vehicle weight
c. Vehicle diagnostics check with full OBD status report, including list of available PIDs
d. DPF soot mass / distance since last regen (if appropriate)*
e. 12 & 48V/HV Battery State of Charge (if applicable)

Check the soot loading for Diesel application and make sure the vehicle will not perform a DPF RGN during the test. If need , perform a DPF RGN followed by 60min stabilisation.

For RDE post-processing (Moving Average Window), the reference CO2 masses shall be provided. The values are to be obtained from the WLTC in the Charge Sustaining mode. Trip dynamics indicators; $V.a_{pos}$ and RPA, shall also be included in the data post-processing/ reporting.

The following tests shall be completed for the applicable vehicle types, as specified in subsequent paragraphs;

a. RDE standard test – Cold start, Charge sustaining condition (HV battery depleted)
b. RDE High-SOC test – Cold start, Charge depleting condition (HV battery fully charged)

7. Specific Test Requirements – "RDE standard test"

In addition to the overall RDE test requirements listed above, for the standard test the vehicle shall start the test with a cold engine. Therefore, the vehicle shall be preconditioned and soaked as per the regulation it falls under.

The vehicle SOC before test should be set such that the vehicle is in a charge sustaining condition, close to the SOC observed during the laboratory WLTC charge sustaining test. Therefore, the vehicle shall be preconditioned accordingly.

8. Specific Test Requirements – "RDE High-SOC test"

This test shall follow the same requirements for the standard RDE test, with the exception of the starting HV battery SOC, which shall be fully charged, during soaking, before the test.

9. Specific Test Requirements – "RDE back to back test"

Following the standard RDE road testing each vehicle will require 2 additional RDE tests to the same qualifying criteria as the legislative road RDE test to be carried out on the Dynamometer back to back with vehicle ignition remaining on the whole time (No Key Off). Lab RDE drive characteristics could be based on the characteristics recorded as driven on the standard RDE road test for each vehicle.

Where possible exhaust gas collection and processing to the requested package as detailed in each vehicle specific test request should be completed using lab analysers (PEMS can also be used as secondary collection and processing). The individual lab reports should contain all the relevant information at the format of an RDE report (urban and Overall section, Vapos MAW, RPA and test conditions…)

These tests may also have different requirements as listed below

- Vehicle weight
- Driving characteristics (more aggressive for example)
- Testing ambient temperature
- Soak temperature
- Transient Loading

Please include costs for these individual elements

10. Additional testing requirements as necessary

Please supply additional costs in your separate schedule of costs for the following:

- Cost to install a VCA supplied/lab hired PEMS kit
- Cost for correlation of additional PEMS kit
- Daily Hire charge for a PEMS kit (outside normal initial test requirements)
- Cost to transport Vehicle to and from Vehicle Certification Agency, Midlands Centre, Watling Street, Nuneaton, Warwickshire, CV10 0UA
- Daily track use hire charge for supplier to complete additional testing (including labour for running test)
- Cost to transport Vehicle to and from supplier test facility

11. 4 Wheel Drive Vehicles

The Supplier shall test vehicles in 4 wheel drive mode when instructed to do so by the Authority or as the original approval requirements. Bidders must demonstrate their capability in this regard in their proposal.

12. Delivery of Results

A report containing all the regulated pollutants in conjunction with the test data files should be provided to DVSA within 1 working day of test completion. If tests are aborted or delayed this should be reported to DVSA within 1 working day. Preliminary results shall also be provided as soon as possible post-test to allow for review of results in between tests, in case it is necessary for test repeats to be authorised as soon as possible.