

From the author:

The text proposal below concerns the first part of the test procedure for the Type 6 test, in particular the modification to the road load of the test vehicle and the transfer of the road load to the chassis dynamometer in Type 6 conditions. It should be seen as a first draft, so it may not be fully complete.

The text in EU WLTP (Regulation (EU) 2018/1832) for the ATCT test, see paragraph 3 of Sub-Annex 6a, was taken as a template for this procedure. Since the details of the test procedure are not decided yet in detail, these are placed in [square brackets].

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Type 6 test procedure for the determination of CO₂ emissions, electric range and energy consumption under low temperature conditions

3. Type 6 test procedure
The Type 1 test specified in Annex 6 shall be carried out with the exception of the requirements specified in paragraphs 3.1. to 3.9. of this Annex. That requires also a new calculation and application of gearshift points in accordance with Annex 2 taking into account the different road load as specified in paragraph 3.4. of this Annex.
- 3.1. Ambient conditions for the Type 6 test
 - 3.1.1. Prior to the soak at the low temperature, the vehicle should be soaked at a temperature of 23 °C. The engine oil temperature and coolant temperature, if any, shall be within ± 2 °C of the set point [of 23 °C or] T_{low}, whichever temperature is chosen for the preconditioning.
 - 3.1.2. The temperature (T_{low}) at which the vehicle should be soaked and tested for the Type 6 test shall be -7 °C.
 - 3.1.3. The minimum soaking time (t_{soak_precon}) before the preconditioning shall be [9] hours.
- 3.2. Test cell and soak area
 - 3.2.1. Test cell
 - 3.2.1.1. The test cell shall have a temperature set point equal to T_{low}. The actual temperature value shall be within [± 3 °C] at the start of the test and within [± 5 °C] during the test.
 - 3.2.1.2. The specific humidity (H) of either the air in the test cell or the intake air of the engine shall be such that: [3.0 ≤ H ≤ 8.1] g H₂O/kg dry air.
 - 3.2.1.3. The air temperature and humidity shall be measured at the cooling fan outlet at a rate of [0.1] Hz.
 - 3.2.2. Soak area
 - 3.2.2.1. The soak area shall have a temperature set point equal to T_{low} and the actual temperature value shall be within [± 3 °C] on a [5 minute] running arithmetic average and shall not show a systematic deviation from the set point. The temperature shall be measured continuously at a minimum frequency of [0.033] Hz.
 - 3.2.2.2. The location of the temperature sensor for the soak area shall be representative to measure the ambient temperature around the vehicle and shall be checked by the technical service. The sensor shall be at least 10 cm away from the wall of the soak area and shall be shielded from direct air flow. The air-flow conditions within the soak room in the vicinity of the vehicle shall represent a natural convection flow representative for the dimension of the room (no forced convection).
- 3.3. Test vehicle

Commented [IR1]: This means that where this Annex deviates from Annex 6, we have to follow the procedure indicated here (check the correct numbering afterwards)

Commented [IR2]: The ATCT test procedure is a bit different: The engine temperature shall be within ± 2 °C of the set point of 23 °C or T_{low}, whichever temperature is chosen for the preconditioning.

The vehicle to be tested shall be representative of the family for which the Type 6 data are determined, as described in paragraph [xxx] of this Annex.

- 3.3.2. From the Type 6 family, the Interpolation Family [with the lowest engine capacity] shall be selected (see paragraph [xxx] of this Annex), [and the test vehicle shall be in the 'vehicle H' configuration of this family].

[Where applicable, the vehicle with the lowest enthalpy of the active heat storage device and the slowest heat release for the active heat storage device from the Type 6 Family shall be selected.]

- 3.3.4. The test vehicle shall meet the requirements detailed in paragraph 2.3. of Annex 6 and paragraph [xxx] of this Annex.

3.4. Settings

- 3.4.1. Road load and dynamometer settings shall be as specified in Annex 4, with the exception of the requirement for the room temperature to be at 23 °C. 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 7. and 8. of Annex 4. To take account of the difference in air density at -7 °C when compared to the air density at 20 °C, the chassis dynamometer coefficient C_d shall be adapted in accordance with the following equation:

$$C_{d_Tlow} = C_d + (f_2 \cdot T_{low} - f_2)$$

and

$$f_{2_Tlow} = f_2 * (T_0 + 273)/(T_{low} + 273)$$

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 GTR, °C,
 T_{low} is the Type 6 temperature, as defined in paragraph 3.1.1., °C.

In the case that a valid chassis dynamometer setting of the 23 °C test is available,

- 3.4.2. The same test cell shall be used for the setting of the chassis dynamometer at 23 °C and for the setting of the chassis dynamometer at the temperature T_{low}
- 3.4.3. The same set of tyres shall be fitted to the test vehicle for the setting of the chassis dynamometer at 23 °C and for the setting of the chassis dynamometer at the temperature T_{low} . Prior to the Type 6 test, the tyre pressure shall be adjusted to the same pressure as applied for the setting of the chassis dynamometer at 23 °C.
- 3.4.4. The Type 6 test and its road load setting shall be performed on a 2WD dynamometer in the case that the corresponding Type 1 test was done on a 2WD dynamometer and it shall be performed on a 4WD dynamometer in the case that the corresponding Type 1 test was done on a 4WD dynamometer.

[if Japan insists to allow the R83 alternative for level 1B, this can be inserted here]

3.5. Preconditioning

The preconditioning phase shall be undertaken with the vehicle and the test cell at the temperature of T_{low} and in accordance with the specifications in paragraph 3.5.1. to 3.5.4..

[At the request of the manufacturer preconditioning may be undertaken at 23 °C. In this case the vehicle transfer from the soak area to the test cell, and after the preconditioning cycle from the test cell to the soak area shall be as short as possible and not exceed [10] minutes]

The engine oil temperature and coolant temperature, if any, shall be within ± 2 °C of the set point [of 23 °C or] T_{low} , whichever temperature is chosen for the preconditioning.

Commented [IR3]: Refer to the paragraph on family definitions

Commented [IR4]: This is listed the main body text. Check if this is the correct way to make this reference.

Commented [IR5]: This is included in the ACEA proposal, but cannot be agreed until there is proper evidence that this has no significant effect on the results.

- 3.5.1. Pure ICE vehicles shall be preconditioned [over one WLTCs] and in accordance with paragraph 2.6. of Annex 6.
- 3.5.2. NOVC-HEVs shall be preconditioned [over one WLTC] and in accordance with paragraph 3.3.1.1. of Annex 8.
- 3.5.3. OVC-HEVs shall be preconditioned [over a maximum of two WLTCs and in accordance with paragraph 2.1.1. or 2.1.2. of Appendix 4 to Annex 8. [During the last WLTC the REEC_i value shall be below [4]%. The manufacturer is allowed to set the SoC to such a level prior to the soak period that this criterion can be met.]
- 3.5.4. [PEVs shall be preconditioned over one WLTC, one WLTC City cycle, and a maximum of [10] km at a speed of [100 km/h] or less, and in accordance with paragraph 3. of Appendix 4 to Annex 8. [Before the end of the preconditioning phase, the REESS should reach the break-off criterion as specified in paragraph 3.4.4.1.3. of Annex 8. The manufacturer is allowed to set the SoC to such a level prior to the soak period that this criterion can be met.]
- 3.6. Soak procedure
 - 3.6.1. After preconditioning and before testing, vehicles shall be kept in a soak area with the ambient conditions described in paragraph 3.2.2.1. of this annex.
 - 3.6.2. From the end of the preconditioning until the soaking at T_{low}, the vehicle shall not be exposed to a different temperature than T_{low} for longer than [10 minutes].
 - 3.6.3. The vehicle shall then be kept in the soak area such that the soaking time (t_{soak_Lowtemp}) from the end of the preconditioning test to the beginning of the Type 6 test is equal to a minimum soaking time of [12] hours and a maximum of [18] hours.
 - 3.6.4. The soak shall be performed without using a cooling fan and with all body parts positioned as intended under normal parking operation. The time t_{soak_Lowtemp} shall be recorded.
 - 3.6.5. The transfer from the soak area to the test cell shall be undertaken as quickly as possible. The vehicle shall not be exposed to a temperature different from T_{low} for longer than [10 minutes].