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CLIMA.C.4 - Road Transport

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IMPLEMENTATION OF THE NEDC/WLTP CORRELATION PROCEDURES FOR CARS AND LIGHT COMMERCIAL VEHICLES

1. INTRODUCTION

This paper provides further information on the implementation of the NEDC/WLTP correlation procedures[1]. It will be up-dated regularly in case new issues arise. Please send any questions to the Commission at the following address: EC-CO2-LDV-IMPLEMENTATION@ec.europa.eu and indicating "correlation question" in the subject matter.

In accordance with point 2.1.3 of Annex I to the Correlation Regulations, the correlation tool may be updated annually with a new version released on 1 September or by way of amendments to Regulations (EU) 2017/1152 and 2017/1153 (Correlation Regulations).

2. OFFICIAL VERSION OF THE CO2MPAS CORRELATION TOOL

A new CO2MPAS version 3.0.X. was released on 30 January 2019. This version facilitates the implementation of the recent amendments to the Correlation Regulations (Regulations (EU) 2018/2042 and 2018/2043[2] with entry into force on 11 January 2019) and is compatible with the new DICE3 procedures and input template version 3.0.1.

The DICE3 is based on a centralized server and users need to obtain authorization to access it. The email with instructions has been sent to designated CO2MPAS users on 28 January 2019. If more help is needed, please contact JRC-CO2MPAS@ec.europa.eu or JRC-CO2DICE@ec.europa.eu.

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[1]   **Cars**: Commission Implementing Regulation (EU) 2017/1153 of 2 June 2017 setting out a methodology for determining the correlation parameters necessary for reflecting the change in the regulatory test procedure and amending Implementing Regulation (EU) No 1014/2010, OJ L 175.

   Vans: Commission Implementing Regulation (EU) 2017/1152 of 2 June 2017 setting out a methodology for determining the correlation parameters necessary for reflecting the change in the regulatory test procedure with regard to light commercial vehicles and amending Implementing Regulation (EU) No 293/2012, OJ L 175.

[2]   https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018R2042

   https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018R2043

The new CO2MPAS version 3.0.X. with DICE3 is considered as the official version as from 1 February 2019. In order to provide for additional lead-time, CO2MPAS version 2.0.0. with DICE2 **may be used until 29 March 2019**.

However, for all new vehicles placed on the market in 2020, for which the input data have not been submitted in accordance with the DICE3 procedures, the correlation files will have to be up-dated in accordance with a CO2MPAS 3.0.X. execution and submitted to DICE3 retroactively and **no later than 30 April 2021**.

It is therefore recommended to start using the new CO2MPAS 3.0.X. and DICE3 as soon as possible.

3. THE CAPACITY OF THE CO_2MPAS CORRELATION TOOL TO SIMULATE VEHICLES WITH ADVANCED TECHNOLOGIES

With regard to point 2.1 of Annex I to the Commission Implementing Regulations (EU) No 2017/1152 and 2017/1153 related to the capacity of the correlation tool to simulate NEDC CO_2 values of individual M1 and N1 vehicles, physical measurements should be used instead of simulations in the case of the following vehicle technologies:

- **Hybrid electric vehicles (HEVs),** including both not off-vehicle charging hybrid electric vehicles **(NOVC-HEVs)** and off-vehicle charging hybrid electric vehicles **(OVC-HEVs)**

In the case of the above mentioned technologies, the physical testing should be performed in accordance with the relevant provisions referring to physical testing set out in Annex I to the Regulations, in particular:

- Section 2: regarding the calculation of NEDC inertia and road load coefficients for vehicle H, and where applicable vehicle L;
- Section 3: regarding the number of physical NEDC tests, interpretation of CO_2 test results, calculation of fuel consumption, and calculation of phase-specific CO_2 and fuel consumption values; and
- Section 4: regarding the calculation of the CO_2 and fuel consumption values that will be attributed to the individual M1 and N1 vehicles.

4. RECORDING OF DATA

Type approval authorities and/or technical services shall record the information listed in point 5 of Annex I to the Correlation Regulations. This means that a type approval certificate shall always include **both the NEDC and the WLTP CO_2 values of vehicle high and, where applicable, vehicle low** (see Annex I to Regulation (EU) 2017/1151 – addendum to the appendix to the type approval certificate).

5. ERRORS IN THE CO2MPAS INPUT FILE

In case an error is detected in the input file after the random selection procedure ("dicing") has been performed, corrections may be made in accordance with the procedures described below. It should be underlined that type approval authorities and technical services are responsible for all corrections made, their proper documentation

and traceability. The procedures are now updated in order to be aligned with the new DICE3 functionalities.

In all cases where errors are detected, the CO2MPAS user should inform the JRC (JRC-CO2MPAS@ec.europa.eu).

5.1. Corrections of interpolation family ID

In case of corrections of the interpolation family ID, the CO2MPAS user should inform the JRC and DG CLIMA and provide a description of the error and the correction that will take a place. The email exchange with the JRC/DG CLIMA shall be recorded in the type approval documentation. After receiving the email (i.e. JRC-CO2MPAS@ec.europa.eu and EC-CO2-LDV-IMPLEMENTATION@ec.europa.eu), JRC will allow the user to submit the corrected CO2MPAS input file (new co2mpas.ta file) where only the interpolation family ID has been changed. Please note that input data are cross-checked and in cases where only the interpolation family ID has been changed the user will receive an email confirmation with the original random number (i.e. the random number as determined for the original interpolation family ID).

5.2. Changes in the NEDC declared values

It follows from the rationale of the correlation procedure, that a change in the declared NEDC value for an interpolation family should normally only take place following a formal change in the WLTP values for that family (e.g. as a result of an extension or extrapolation in accordance with Regulation 2017/1151). In those cases, the change in values is clearly traceable through the type approval numbering of the interpolation family and the corresponding NEDC values may be determined in accordance with the correlation procedure as set out in the Correlation Regulations.

However, changing the NEDC declared value of an interpolation family after the finalisation of the CO2MPAS simulation, without a corresponding change in the WLTP values, may create a loophole through which the 4% tolerance allowed in the NEDC procedure can be unduly exploited. Moreover, the safeguard represented by the random selection procedure ("dicing") in the correlation procedure may in that way be by-passed.

A change in the NEDC declared value should therefore only be allowed exceptionally, where it is clear that a correction is needed due to a clerical error in the original declaration. It is therefore important that type approval authorities/technical services check carefully, before proceeding with the CO2MPAS simulations, that the manufacturer has provided an NEDC declared value and that that value is consistently recorded throughout the type approval documentation.

If the type approval authority/technical service is satisfied that a correction of the declared value is needed, the following steps should be taken:

- The CO2MPAS user should inform JRC and DG CLIMA about the change (i.e. JRC-CO2MPAS@ec.europa.eu and EC-CO2-LDV-IMPLEMENTATION@ec.europa.eu)

- A new CO2MPAS simulation shall be performed with the new declared NEDC value and the new co2mpas.ta file submitted to DICE3

- The random number received should be ignored

- A physical vehicle NEDC test should always be performed (i.e. to confirm the declared value)

- A deviation factor and verification factor shall always be recorded and added to the type approval certificate as well as in the certificate of conformity

All e-mail correspondence between the type approval authority/technical Service and the JRC/DG CLIMA, including the two output files, shall be recorded in the type approval documentation.

In very exceptional cases, where both NEDC-L and NEDC-H declared values are corrected, and both NEDC physical tests performed result in two deviation and two verification factors, the average deviation factor and the higher verification factor (1 in this case) should be recorded in all type-approval documentation and used for the correction of the NEDC CO_2 values in accordance with Article 7 of Regulation (EU) 2017/1153 and Article 6 of Regulation (EU) 2017/1152.

5.3. Corrections of all other parameters

This refers to all other corrections in the CO2MPAS input file, e.g. the NEDC and WLTP test mass, road loads, bag results, OBD signals, etc.

The CO2MPAS user should inform JRC and DG CLIMA and provide a description of the error and its impact on CO_2 results (i.e. the CO2MPAS deviation value before and after correction).

After receiving the email (i.e. JRC-CO2MPAS@ec.europa.eu and EC-CO2-LDV-IMPLEMENTATION@ec.europa.eu), JRC will allow the user to submit the corrected CO2MPAS input file (new co2mpas.ta file). The user will receive an email with the new random number.

The users should respect all DICE decisions, old and new random numbers, and this means that before any corrections are made, they should ensure that the vehicle is available for a possible NEDC physical test.

The type approval authority/technical service should document both the original and the new CO2MPAS summary reports and e-mail correspondence with JRC and DG CLIMA in the type approval documentation.

6. TYPE APPROVAL EXTENSIONS

In the case of type-approval extensions, the CO2MPAS/DICE3 procedure should be performed again for the same interpolation family ID in the following cases;

- Extensions where a new WLTP physical test of vehicle H and/or L is performed or where any WLTP values (road loads, test mass, declared CO_2 emissions, full load power curve, etc.) of vehicle H and L are different from the original type-approval values; and/or

- Extensions where NEDC values (road loads, test mass, declared CO_2 emissions) of vehicle H and L are different from the original type-approval values.

In these cases the new co2mpas.ta file resulting from the new CO2MPAS run should be submitted to DICE3 and the random number will be received.

7. NOVELTIES IN INPUT TEMPLATE VERSION 3.0.1

In order to further facilitate the correlation process, some new functionalities are introduced with the new DICE3. The new CO2MPAS input template (version 3.0.1.) also includes the new input fields reflecting the amendments of December 2018.

a) **Interpolation family IDs - parent/child approach**:

Where the WLTP physical tests and all other inputs in the CO2MPAS input template are the same and these inputs are used in the type-approval process (documentation) of two or more interpolation family IDs (also with different WMI codes), the new CO2MPAS template introduces the concept of parent/child approach with regard to the interpolation family IDs. In this approach the WLTP physical tests are assigned to the first interpolation family ID (future parent) and that interpolation family ID is to be provided in the template field "Interpolation Family ID". After running CO2MPAS, the co2mpas.ta file of that interpolation family ID should be submitted to the DICE3 and the random number will be received.

In the case where the same input template (the same WLTP vehicle H and L test results) will be used for another interpolation family ID, the CO2MPAS/DICE3 should be executed again, but this time the parent interpolation family ID should be provided in the template field "Parent Interpolation Family ID", and the new child interpolation family ID in the field "Interpolation Family ID". The user will receive an email confirmation that this new interpolation family ID is submitted to DICE3 server, but the random number will not be sent.

b) **Bi-fuel vehicle**:

If the vehicle is bi-fuel, the results of the WLTP physical tests for both fuels should be submitted to the DICE3 server. When running the first CO2MPAS input template with the results of first fuel test, the "1"in the field "Bi-fuel vehicle" should be selected. The co2mpas.ta file of the first fuel should be submitted to DICE3, but the email with random number will not be received until the second co2mpas.ta file of the second fuel test is submitted to DICE3.

c) **ATCT FCF**:

This is a new input in the template. Exceptionally, where WLTP physical test results of vehicle H and L are the same, but the interpolation family IDs are different and ATCT FCFs are also different, the CO2MPAS/DICE3 procedure described in point (a) shall be followed. The only difference is that ATCT FCF should be provided in the first step for the parent interpolation family ID and in the second step, if another interpolation family ID uses the same physical test results, the ATCT FCF should be provided for that child interpolation family ID.

d) **WLTP re-test**:

This is a new input in the template reflecting the latest amendments to the Correlation Regulations (section 2.2a of Annex I). If CO2MPAS needs to be executed for the same interpolation family ID again due to a WLTP re-test, this should be specified in the field "WLTP re-test".

e) **Extension of interpolation family**:

This is a new input in the template. The procedure to follow is described in section 6 above.

f) **WLTP theoretical gear in time-series spreadsheet of vehicle H and L**:

This input is now mandatory for all vehicles with manual transmission.

g) **WLTP test a, b, c**:

For correlation purposes WLTP test a is the test selected for correlation according to provisions of Correlation Regulations (section 2.2). In cases where more than one WLTP physical test is performed, these results should be provided in the fields reserved for WLTP test b and test c.

h) **10Hz speed data**:

This input is now mandatory and concerns the driven speed profile (not theoretical) for vehicle H and L for the purpose of speed and distance correction. If more than one WLTP test is performed, results should be provided for these WLTP physical tests as well.

i) **Prediction WLTP**:

This input is not mandatory and should be provided only in the cases where the speed profile is different from class 3b (also in cases where capped speed is applied and/or downscaling).

For more information and for all exchanges with JRC and DG CLIMA, please use the following functional e-mail addresses:

DG CLIMA: EC-CO2-LDV-IMPLEMENTATION@ec.europa.eu

JRC: JRC-CO2MPAS@ec.europa.eu and JRC-CO2DICE@ec.europa.eu