# CO$_2$/FC correction for (N)OVC-HEV/(N)OVC-FCHV

Proposed update by ACEA EV for WLTP SG EV to give the option to avoid unnecessary testing without additional value

Status: 18.02.2020

# NOVC-HEV/NOVC-FCHV: CO$_2$/FC correction
## Proposal ACEA EV for SG EV (example here based on NOVC-HEV)

- ACEA EV is supporting the approach of a generic worst case correction as for pure ICE vehicle due to

  - the high measurement effort nowadays without any additional value (as factor are similar/identical)

  - the procedure is not reproducible due to measurement inaccuracies caused by small REESS compared to absolute CO$_2$ values; therefore massively different corrections could be the consequence)

- It should be at the option of the manufacturer to use a generic worst case correction or to use a physically determined K$_{CO2}$ factor

- Proposal: Use of the pure ICE vehicle approach but apply different generator efficiency depending on REESS discharging and charging

  ➔ Generator efficiency "n$_{alternator}$ = 1" is "Worst case approach"

| | Willans Factor | Generator efficiency with neg. REESS Balance (Discharging) | Generator efficiency with pos. REESS Balance (Charging) |
|---|---|---|---|
| Diesel (B7) | 161 (unchanged) | 0,67 | 1 |
| Petrol (E10) | 184 (unchanged) | 0,67 | 1 |

Calculation of CO$_2$-Delta which need to be corrected:

$$\Delta M_{CO2,j} = 0{,}0036 \times \Delta E_{REESS,j} \times \frac{1}{\eta_{alternator}} \times Willans_{factor} \times \frac{1}{d_j}$$

➔ With n$_{alternator}$ = 1 ➔ smallest $\Delta M_{CO2,j}$

Calculation of corrected CO$_2$ value:

$$M_{CO2,c,3} = M_{CO2,c,2} - \Delta M_{CO2,j}$$

➔ With smallest $\Delta M_{CO2,j}$ ➔ highest $M_{CO2,c,3}$

# NOVC-HEV/NOVC-FCHV: CO$_2$/FC correction

## Proposal ACEA EV for SG EV

Text Proposal:

(…)

➔ **Text still need to be developed**

➔ **Will be done in advance of WD submission**

# OVC-HEV/OVC-FCHV: $K_{CO2}$/$K_{FCHV}$ correction factor family
Proposal ACEA EV for SG EV

Text proposal:

For OVC-HEV (and if applicable OVC-FCHV), it is allowed to include other interpolation families into the same $K_{CO2}$ (and if applicable $K_{FCHV}$) correction factor family at which $K_{CO2}$ (and if applicable $K_{FCHV}$) shall be determined with vehicle H of one of the included interpolation families.

At the request of the responsible authority, the manufacturer shall provide evidence on the justification and technical criteria for merging these interpolation families, ensuring that there is a large similarity between those families, for example in the following cases:

- two or more interpolation families are merged which were split because the maximum interpolation range of 20 g/km $CO_2$ is exceeded (in case vehicle M measured: 30g/km);

- interpolation families that were split because there are different engine power ratings of the same combustion engine;

- interpolation families that were split because the n/v ratios are just outside the tolerance of 8%;

- interpolation families that were split, but still fulfil all the family criteria of a single IP family.

- interpolation families that were split because there is different number of powered axles

Different electric energy converters between recharge-plug-in and traction REESS shall not be considered as an criterion in the context of the correction factor family as no impact on $K_{CO2}$ and $K_{FCHV}$ determination procedure.

# Back Up

# OVC-HEV/OVC-FCHV: $K_{CO2}$/$K_{FCHV}$ correction factor family
## CoP family for Type 1 test as basis

8.1.3.1. CoP family for Type 1 test

For the purposes of the manufacturer's conformity of production check on the Type 1 test, including, where applicable and if required, the determination of the OBFCM device accuracy, the family means the conformity of production (CoP) family as specified in paragraphs 8.1.3.1.1 and 8.1.3.1.2.

8.1.3.1.1. For interpolation families as described in paragraph 6.3.2. of this Regulation with a planned vehicle production volume of more than 1,000 vehicles per 12 months, the CoP family for the Type 1 test shall be identical to the interpolation family.

8.1.3.1.2. For interpolation families as described in paragraph 6.3.2. of this Regulation with a planned production volume of 1,000 vehicles or less per 12 months, it is allowed to include other interpolation families into the same CoP family, up to a combined maximum production volume of 5,000 vehicles per 12 months. At the request of the responsible authority the manufacturer shall provide evidence on the justification and technical criteria for merging these interpolation families, ensuring that there is a large similarity between those families, for example in the following cases:

- two or more interpolation families are merged which were split because the maximum interpolation range of 30 g/km CO2 is exceeded;

- interpolation families that were split because there are different engine power ratings of the same combustion engine;

- interpolation families that were split because the n/v ratios are just outside the tolerance of 8%;

- interpolation families that were split, but still fulfil all the family criteria of a single IP family.