Modifications of Post-Processing from GTR#15

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add
modify

Post-Processing (ICE, CS)				
Step	actions	GTR15 Amend#5	EU	JPN
1	raw data	✔	✔	✔
2	phase combined value	✔	✔	✔
2b	drive trace correction for ICE only	NA	✔	NA
3	REESS correction	✔	✔	✔
4a	Ki	✔	✔	✔
4b	phase value correction by Ki	✔	✔	✔
4c	FE calculation	NA	NA	✔ (km/L)
	RI correction for COP	NA	✔	✔
5	regional correction	✔	✔ (ATCT)	NA
	apply DF for pollutants	✔	✔	✔
	check to go to next test or not	✔	✔	✔
6	determine "declared value"	✔	✔ (CO2)	✔ (FE)
	convert "declared FE" to CO2	✔	NA	✔
7	adjust phase CO2	✔	✔	✔
8	calculate FC and phase FC	✔	✔ (L/100km)	NA
	convert L/100km to km/L (only for phase value)	✔	NA	✔
9	V_L （&V_M） post process (1 to 8)	✔	✔	✔
10	calculate V_ind CO2 (including phase value)	✔	✔ (CO2)	NA
	calculate V_ind FC (including phase value)	✔	✔ (L/100km)	NA
	calculate V_ind FE (including phase value)	✔	NA	✔ (km/L)

add
exclude

Post-Processing (OVC-HEV CD)				
Step	actions	GTR15 Amend#5	EU	JPN
1	CD test results	✔	✔	✔
2	⊿REESS correction	✔	✔	✔
3	calculate # of CD cycle and R_CDC	✔	✔	✔
4	check # of CD cycle for V_H, V_L and V_M	✔	✔	✔
5	calculate CD PM and PN	✔	✔	NA
6	calculate average CD pollutants	✔	✔	NA
7	AER_city	✔	✔	NA
8	UF	✔	✔	NA
9	E_AC_weighted, E_AC_CD	✔	✔	NA
10	CO2_CD para. 4.1.2.	✔	✔	add JPN cal
11	FC_CD para. 4.2.2.	✔	✔	NA
	FE_CD para. 4.2.2.	NA	NA	add JPN cal
12	EC_DC_CD_first for COP	NA	✔	✔
13	averaging	✔	✔	✔
	EC_AC_CD, CO2_CD,	✔	✔	NA
	FC_CD (l/100km)	✔	✔	NA
	EC_DC_CD_first for COP	NA	✔	✔
	FE_CD (km/l)	✔	NA	✔
14	determine "declare value"	✔	✔	✔
	EC_AC_CD, CO2_CD	✔	✔	NA
	FE_CD para. 4.2.2.	✔	NA	✔
15	adjust EC_DC_CD_first for COP	NA	add EU ratio	add JPN ratio
16	rounding	✔	✔	✔
17	interpolation	✔	✔	✔
	EC_AC_CD, CO2_CD, EC_AC_weighted, FC_CD (L/100km)	✔	✔	NA
	FE_CD	✔	NA	✔

calculate CD_CO2 without UF

$$M_{CO2,CD} = \frac{\sum_{j=1} M_{CO2,CD,j} \times d_j}{\sum_{j=1} d_j}$$

calculate CD_FE considering the transition cycle

$$FE_{CD} = \frac{R_{CDA}}{\sum_{c=1}^{n-1} d_c \times \frac{1}{FE_{CD,c}} + d_n \times \frac{k_{CD}}{FE_{CD,n}}}$$

Post-Processing OVC-HEV CD/CS weighted				
Step	actions	GTR15 Amend#5	EU	JPN
1	CS and CD test results	✔	✔	✔
	CO2, AER, E_AC,	✔	✔	✔
	M, PN, PM, AER_city, R_CDC,,,,,,	✔	✔	NA
2	calculate CS/CD weighted	✔	✔	NA
	M, PN, PM	✔	✔	NA
3	calculate EAER, R_CDA	✔	✔	✔
4	AER for interpolation	✔	✔	✔
5	averaging AER and determine "declared value"	✔	✔	✔ "declared AER" is not necessary
6	calculate CS/CD weighted	✔	✔	NA
	CO2, FC (L/100km)	✔	✔	NA
7	calculate EC based on EAER	✔	✔	✔
8	averaging and determine "final value"	✔	✔	✔
	adjust phase EC value	NA	NA	✔
	AER_city, CO2, FC (L/100km),	✔	✔	NA
	EC, EAER	✔	✔	✔
9	interpolation	✔	✔	✔
	AER_city, CO2, FC (L/100km), EAER	✔	✔	NA
	EC, AER,	✔	✔	✔

$$EC_{p,final} = EC_{p,ave} \times \frac{EC_{dec}}{EC_{ave}}$$

<reference> Required Parameter (✔) during type approval testing and Criteria to proceed the additional tests for Level 1B

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		pollutants	Fuel Efficiency (km/L or km/kg)					Electric Consumption (Wh/km)						Range (km)					
		Total	Total	L	M	H	ex-H	Total	L	M	H	ex-H	city	Total	L	M	H	ex-H	city
ICE		✔	✔	✔	✔	✔	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NOVC-HEV		✔	✔	✔	✔	✔	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
OVC-HEV	CD	check by each applicable WLTC cycle	✔	NA	NA	NA	NA	✔ (EC)	✔	✔	✔	NA	NA	EAER	**	**	**	NA	NA
														RCDA	NA	NA	NA	NA	NA
														RCDC**	NA	NA	NA	NA	NA
														AER	NA	NA	NA	NA	NA
	CS	✔	✔	✔	✔	✔	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Combined	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PEV		NA	NA	NA	NA	NA	NA	✔	✔	✔	✔	NA	NA	✔	**	**	**	NA	NA
NOVC-FCHV			✔	✔	✔	✔	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
OVC-FCHV	CD	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	CS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Combined	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

criteria to proceed the additional tests

✔, red letter : different from EU

** : necessary only for calculation process