VOLKSWAGEN

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Calculation for variable volume SHEDs
Discussion paper for WLTP TF Evap.

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Calculation of evaporative test results according to current ECE regulation	Proposal: Calculation of evaporative test results (acc. to EPA/CARB) for variable volume enclosures

Equation:

$$M_{HC} = k \times V \times \left(\frac{C_{HCf} \times P_f}{T_f} - \frac{C_{HCi} \times P_i}{T_i} \right) + M_{HC,out} - M_{HC,in}$$

for variable volume enclosure "$M_{HC,out}$" and "$M_{HC,in}$" is set to zero

Equation:

$$MHC = k \times V \times \frac{P_i}{T_i} \times (C_{HCf} - C_{HCi})$$

			ECE value	unit				EPA value	unit
C_{HCi}	=	measured HC concentration, initial reading	2	ppm	C_{HCi}	=	measured HC concentration, initial reading	2	ppm
C_{HCf}	=	measured HC concentration, final reading	2	ppm	C_{HCf}	=	measured HC concentration, final reading	2	ppm
P_i	=	barometric pressure, initial reading	100,3	kPa	P_i	=	barometric pressure, initial reading	100,3	kPa
P_f	=	barometric pressure, final reading	101,3	kPa	P_f	=	barometric pressure, final reading	101,3	kPa
T_i	=	ambient chamber temperature, initial reading	293	K	T_i	=	ambient chamber temperature, initial reading	293	K
T_f	=	ambient chamber temperature, final reading	293	K	T_f	=	ambient chamber temperature, final reading	293	K
V	=	net enclosure volume substracted by 1,42	58	m3	V	=	net enclosure volume substracted by 1,42	58	m3

Diurnal	k	=	1,2 x 10-4 x (12+H/C) with H/C=**2,33**	0,0017196	Diurnal	k	=	1,2 x 10-4 x (12+H/C) with H/C=**2,33**	0,0017196
Hot Soak	k	=	1,2 x 10-4 x (12+H/C) with H/C=**2,2**	0,001704	Hot Soak	k	=	1,2 x 10-4 x (12+H/C) with H/C=**2,2**	0,001704

Result:

M_{HC}	mass of hydrocarbons with H/C=**2,33**	0,0006808	g	M_{HC}	mass of hydrocarbons with H/C=**2,33**	0	g
M_{HC}	mass of hydrocarbons with H/C=**2,2**	0,00067462	g	M_{HC}	mass of hydrocarbons with H/C=**2,2**	0	g