8.4.6 Amend subparagraph (d)(10): At the conclusion of the US06 emission test, one of the following conditions shall apply:

(i) For hybrid electric vehicles that do not allow the auxiliary power unit to be manually activated and are charge-sustaining over the SC03, record the battery state-of-charge to determine if the SOC Criterion (see Definitions, section B of these procedures) is satisfied. If the SOC Criterion is not satisfied, then turn off cooling fan(s), allow vehicle to soak in the ambient conditions of paragraph (c)(5) of this section for 10 minutes, and repeat dynamometer test run from subparagraph (d). A total of three SC03 emission tests shall be attempted to satisfy the SOC Criterion. Manufacturers may elect to repeat dynamometer test run from subparagraph (d) following a 10 minute soak in the ambient conditions of paragraph (c)(5) of this section if battery energy level increased significantly relative to the initial battery state-of-charge set at the beginning of SC03 emission test.

(ii) For hybrid electric vehicles that do not allow the auxiliary power unit to be manually activated and are charge-depleting over the SC03, turn off vehicle 2 seconds after the end of the last deceleration.

(iii) For hybrid electric vehicles that allow the auxiliary power unit to be manually activated, turn off vehicle 2 seconds after the end of the last deceleration.

9. State-of-Charge Net Change Tolerances

9.1 For hybrid electric vehicles that use a battery as an energy storage device, the following state-of-charge net change tolerance shall apply:

$$(\text{Amp-hr}_{final})_{max} = (\text{Amp-hr}_{initial}) + 0.01 \frac{(NHV_{fuel} * m_{fuel})}{(V_{system} * K_1)}$$

$$(\text{Amp-hr}_{final})_{min} = (\text{Amp-hr}_{initial}) - 0.01 \frac{(NHV_{fuel} * m_{fuel})}{(V_{system} * K_1)}$$

Where:

$(\text{Amp-hr}_{final})_{max}$	=	Maximum allowed Amp-hr stored in battery at the end of the test
$(\text{Amp-hr}_{final})_{min}$	=	Minimum allowed Amp-hr stored in battery at the end of the test
$(\text{Amp-hr}_{initial})$	=	Battery Amp-hr stored at the beginning of the test
NHV_{fuel}	=	Net heating value of consumable fuel, in Joules/kg

m_{fuel} = Total mass of fuel consumed during test, in kg

K_1 = Conversion factor, 3600 seconds/hour

V_{system} = Battery DC bus voltage (open circuit)

9.2 For hybrid electric vehicles that use a capacitor as an energy storage device, the following state-of-charge net change tolerance shall apply:

$$(V_{final})_{max} = \sqrt{(V_{initial})^2 + 0.01 * \frac{(2*NHV_{fuel}*m_{fuel})}{C}}$$

$$(V_{final})_{min} = \sqrt{(V_{initial})^2 - 0.01 * \frac{(2*NHV_{fuel}*m_{fuel})}{C}}$$

Where:

$(V_{final})_{max}$ = The stored capacitor voltage allowed at the end of the test

$(V_{final})_{min}$ = The stored capacitor voltage allowed at the end of the test

$(V_{initial})^2$ = The square of the capacitor voltage stored at the beginning of the test

NHV_{fuel} = Net heating value of consumable fuel, in Joules/kg

m_{fuel} = Total mass of fuel consumed during test, in kg

C = Rated capacitance of the capacitor, in Farads

9.3 For hybrid electric vehicles that use an electro-mechanical flywheel as an energy storage device, the following state-of-charge net change tolerance shall apply:

$$(rpm_{final})_{max} = \sqrt{(rpm_{initial})^2 + 0.01 * \frac{(2*NHV_{fuel} * m_{fuel})}{(1*K_3)}}$$

$$(rpm_{final})_{min} = \sqrt{(rpm_{initial})^2 - 0.01 * \frac{(2*NHV_{fuel} * m_{fuel})}{(1*K_3)}}$$

Where:

$(rpm_{final})_{max}$	=	The maximum flywheel rotational speed allowed at the end of the test
$(rpm_{final})_{min}$	=	The minimum flywheel rotational speed allowed at the end of the test
$(rpm_{initial})^2$	=	The squared flywheel rotational speed at the beginning of the test
NHV_{fuel}	=	Net heating value of consumable fuel, in Joules/kg
m_{fuel}	=	Total mass of fuel consumed during test, in kg
K_3	=	Conversion factor, $4\pi^2/(3600\ sec^2\text{-}rpm^2)$
I	=	Rated moment of inertia of the flywheel, in $kg\text{-}m^2$