

## USABC Requirements of End of Life Energy Storage Systems for PHEVs

Characteristics at EOL (End of Life)		High Power/Energy Ratio	High Energy/Power Ratio
		Battery	Battery
Reference Equivalent Electric Range	miles	<b>10</b>	<b>40</b>
Peak Pulse Discharge Power (10 sec)	kW	<b>45</b>	<b>38</b>
Peak Regen Pulse Power (10 sec)	kW	<b>30</b>	<b>25</b>
Available Energy for CD (Charge Depleting) Mode, 10 kW Rate	kWh	<b>3.4</b>	<b>11.6</b>
Available Energy for CS (Charge Sustaining) Mode	kWh	<b>0.5</b>	<b>0.3</b>
Minimum Round-trip Energy Efficiency (USABC HEV Cycle)	%	<b>90</b>	<b>90</b>
Cold cranking power at -30°C, 2 sec - 3 Pulses	kW	<b>7</b>	<b>7</b>
CD Life / Discharge Throughput	Cycles/MWh	<b>5,000 / 17</b>	<b>5,000 / 58</b>
CS HEV Cycle Life, 50 Wh Profile	Cycles	<b>300,000</b>	<b>300,000</b>
Calendar Life, 35°C	year	<b>15</b>	<b>15</b>
Maximum System Weight	kg	<b>60</b>	<b>120</b>
Maximum System Volume	Liter	<b>40</b>	<b>80</b>
Maximum Operating Voltage	Vdc	<b>400</b>	<b>400</b>
Minimum Operating Voltage	Vdc	<b>&gt;0.55 x Vmax</b>	<b>&gt;0.55 x Vmax</b>
Maximum Self-discharge	Wh/day	<b>50</b>	<b>50</b>
System Recharge Rate at 30°C	kW	<b>1.4 (120V/15A)</b>	<b>1.4 (120V/15A)</b>
Unassisted Operating & Charging Temperature Range	°C	<b>-30 to +52</b>	<b>-30 to +52</b>
Survival Temperature Range	°C	<b>-46 to +66</b>	<b>-46 to +66</b>
Max. Current (10 sec pulse)	Amps	<b>300</b>	<b>300</b>
Maximum System Production Price @ 100k units/yr	\$	<b>\$1,700</b>	<b>\$3,400</b>