

Performance tests in standards on Li-ion batteries

This table covers performance tests for Li-ion batteries. It is made in the European projects eCaiman, Spicy and Naiades.

batterystandards.info



	IEC 62660-1:2018 (Cell Level)	ISO 12405-4:2011 (Module & System level)	QC/T 743-2006	DOE-INL/EXT-15-34184																																							
Capacity	7.3 Capacity.	7.1&2 Energy and capacity at different temperatures and discharge rates. 7.1.2 & 7.2.2 Test procedures.	6.2.5 Discharge capacity at 20 °C 6.2.6 Discharge capacity at -20 °C 6.2.7 Discharge capacity at 55 °C	3.2 Static Capacity Test																																							
	1/3 C for BEV 1C for HEV Temperature: 0, 25, 45 °C	1/3 C, 1C, 2C and I _{max} for high-energy battery packs 1C, 10C and I _{max} for high-power battery packs Temperature: high-power: -18, 0, RT, 40 °C; high-energy: T _{min} , -18, -10, 0°C, RT	C/3 Temperature: -20°C +/--2°C, 20° +/--5°C, 55 +/--2°C	C/3 at 30°C (recommended) and manufacturer or application specific																																							
Power	7.5 Power. 7.5.1 Test method.	7.3 Power and internal resistance. 7.3.2 Pulse power characterization profile & 7.3.3 Test procedure	6.2.8.1 High energy density battery. 6.2.8.2 High power density battery.	3.4 Hybrid Pulse Power Characterization Test																																							
	10s pulse & 10 min pause SOC: 20, 50, 80 % Temperature: 40, 25, 0, -20°C	SOC: high-power: 80, 65, 50, 35, 20 %; high-energy: 90,70, 50, 35, 20 % Temperature: high-power: -18, -10, 0, RT, 40 °C; high-energy: -25,-18,-10,0,RT, 40°C	Temperature: 20°C +/--5°C	10s pulse and 1h pause SOC 90% to 10% with 10% increments at 30°C (recommended) and manufacturer or application specific																																							
	Current pulse: maximum allowed discharge and charge current at the given SOC and temperature	<div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 2px;">high-power pack & system</div> <div style="border: 1px solid black; padding: 2px;">high-energy pack & system</div> </div> <div style="display: flex; justify-content: space-around;"> <table border="1" style="font-size: 8px;"> <caption>Table 5 — Pulse power characterization profile</caption> <thead> <tr> <th>Time increment s</th> <th>Time cumulative s</th> <th>Current A</th> </tr> </thead> <tbody> <tr><td>0</td><td>0</td><td>0</td></tr> <tr><td>18</td><td>18</td><td>I_{dp,max}</td></tr> <tr><td>40</td><td>58</td><td>0</td></tr> <tr><td>10</td><td>68</td><td>-0.75 I_{dp,max}</td></tr> <tr><td>40</td><td>108</td><td>0</td></tr> </tbody> </table> <table border="1" style="font-size: 8px;"> <caption>Table 8 — Pulse power characterization profile</caption> <thead> <tr> <th>Time increment [s]</th> <th>Cumulative time [s]</th> <th>Current A</th> </tr> </thead> <tbody> <tr><td>0</td><td>0</td><td>0</td></tr> <tr><td>18</td><td>18</td><td>I_{dp,max}</td></tr> <tr><td>102</td><td>120</td><td>0.75 I_{dp,max}</td></tr> <tr><td>140</td><td>160</td><td>0</td></tr> <tr><td>20</td><td>180</td><td>-0.75 I_{dp,max}</td></tr> <tr><td>40</td><td>220</td><td>0</td></tr> </tbody> </table> </div>	Time increment s	Time cumulative s	Current A	0	0	0	18	18	I _{dp,max}	40	58	0	10	68	-0.75 I _{dp,max}	40	108	0	Time increment [s]	Cumulative time [s]	Current A	0	0	0	18	18	I _{dp,max}	102	120	0.75 I _{dp,max}	140	160	0	20	180	-0.75 I _{dp,max}	40	220	0	High Energy density Discharge 4,5C/3 @ 20°C +/--5°C High Power density Discharge 12C/3 @ 20°C +/--5°C	DCH: 30s @ I _{max} Pause: 40s CH: 10s @ 0.75*I _{max}
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Energy	7.6 Energy, 7.6.1 Test method.	Same as 7.1 & 7.2. (see above)																																									
	1/3 C for BEV 1C for HEV Temperature: 25°C																																										
Energy efficiency	7.8 Energy efficiency 7.8.1.1 Test for normal conditions.	7.8 Energy efficiency. 7.8.3 Test procedure.																																									
	SOC: 100, 70 % (starting at 0%) Temperature: 45, 25, 0, -20°C BEV: 1/3 C ; HEV: 1 C	High-power battery system only! SOC: 35, 50, 65 % Temperature: RT, 40, 0 °C																																									
		<div style="display: flex; justify-content: space-around;"> <table border="1" style="font-size: 8px;"> <caption>Table 23 — Energy efficiency test profile</caption> <thead> <tr> <th>Time increment s</th> <th>Time cumulative s</th> <th>Current A</th> </tr> </thead> <tbody> <tr><td>0</td><td>0</td><td>0</td></tr> <tr><td>12</td><td>12</td><td>20 C or I_{dp,max}</td></tr> <tr><td>40</td><td>52</td><td>0</td></tr> <tr><td>16</td><td>68</td><td>-15 C or -0.75 I_{dp,max}</td></tr> <tr><td>40</td><td>108</td><td>0</td></tr> </tbody> </table> </div>	Time increment s	Time cumulative s	Current A	0	0	0	12	12	20 C or I _{dp,max}	40	52	0	16	68	-15 C or -0.75 I _{dp,max}	40	108	0																							
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Despite our care we do not claim to cover all standards and that all test topics have been given here. The organisations that categorised the available test standards cannot be kept responsible for your decisions.

The involved institutes of this survey are:

