DRAFT - NOT FOR DISTRIBUTION

Data - Exp 6C: Battery charging (7&17Ah) vs Supply etc

Blue - data input   Red - Auto Fill/Calculations

Receiving Battery (ID:B3) - Discharge

Test No.	Capacity (Ah)	Current (mA)	Start Voltage [1] (V)	Energy Discharge (Wh)	Energy Discharge (J) [2]	Start Ah (%)	% Ah	Final Voltage [3] (V)	CBA Test ID	Screengrab File	Comments
1	7	3,000	13.53	17.751	63,904	100.0	20.0	13.23	181022_Discharge_1-1.bt2	181022-Discharge End 1	1 x $LiFePO_4$ - PRF Test
2	7	3,000	13.32	17.769	63,968	100.0	20.0	13.20	181022_Discharge_1-2.bt2	181022-Discharge End 2	1 x $LiFePO_4$ - PRF Test
3	7	3,000	13.33	17.780	64,008	100.0	20.0	13.22	191022_Discharge_1-1.bt2	191022-Discharge End 1	1 x $LiFePO_4$ - PRF Test
4	7	3,000	13.32	17.769	63,968	100.0	20.0	13.22	191022_Discharge_1-2.bt2	191022-Discharge End 2	1 x $LiFePO_4$ - Coil V Test
5	7	3,000	13.33	17.714	63,770	100.0	20.0	13.22	201022_Discharge_1-1.bt2	201022-Discharge End 1	1 x $LiFePO_4$ - Coil V Test
6	7	3,000	13.32	17.734	63,842	100.0	20.0	13.21	201022_Discharge_1-2.bt2	201022-Discharge End 2	1 x $LiFePO_4$ - Coil V Test
7	7	3,000	13.33	17.687	63,673	100.0	20.0	13.22	201022_Discharge_1-3.bt2	201022-Discharge End 3	1 x $LiFePO_4$ - Coil V Test
8	7	3,000	13.21	8.710	31,356	80.0	10.0	13.13	211022_Discharge_1-1.bt2	211022-Discharge End 1	1 x $LiFePO_4$ - Discharge Test
9	7	3,000	13.24	17.627	63,457	90.0	20.0	13.14	221022_Discharge_1-1.bt2	221022-Discharge End 1	1 x $LiFePO_4$ - Discharge Test
10	7	3,000	13.26	26.207	94,345	90.0	30.0	13.13	221022_Discharge_1-2.bt2	221022-Discharge End 2	1 x $LiFePO_4$ - Discharge Test
11	7	3,000	13.25	13.259	47,732	90.0	15.0	13.19	231022_Discharge_1-1.bt2	231022-Discharge End 1	1 x $LiFePO_4$ - Discharge Test
12	7	3,000	13.22	8.828	31,781	80.0	10.0	13.15	231022_Discharge_1-2.bt2	231022-Discharge End 2	1 x $LiFePO_4$ - Discharge Test
13	7	3,000	13.23	13.204	47,534	80.0	15.0	13.13	241022_Discharge_1-1.bt2	241022-Discharge End 1	1 x $LiFePO_4$ - Discharge Test
14	7	3,000	13.32	13.317	47,941	100.0	15.0	13.25	241022_Discharge_1-2.bt2	241022-Discharge End 2	1 x $LiFePO_4$ - Discharge Test
15	7	3,000	13.25	13.211	47,560	90.0	15.0	13.18	251022_Discharge_1-1.bt2	251022-Discharge End 1	1 x $LiFePO_4$ - Discharge Test
16	7	3,000	13.26	17.673	63,623	95.0	20.0	13.18	251022_Discharge_1-2.bt2	251022-Discharge End 2	1 x $LiFePO_4$ - Discharge Test
17	7	3,000	26.76	35.494	127,778	100.0	20.0	26.43	261022_Discharge_1-1.bt2	261022-Discharge End 1	2 x $LiFePO_4$ - PRF Test
18	7	3,000	26.62	35.68	128,448	100.0	20.0	26.44	261022_Discharge_1-2.bt2	261022-Discharge End 2	2 x $LiFePO_4$ - PRF Test
19	18	4,000	13.43	22.863	82,307	100.0	10.0	13.26	271022_Discharge_1-1.bt2	271022-Discharge End 1	Li - PRF Test - (Fixed V_{pk})
20	18	4,000	13.33	22.858	82,289	100.0	10.0	13.26	271022_Discharge_1-2.bt2	271022-Discharge End 2	Li - PRF Test - (Fixed V_{pk})
21	18	4,000	13.42	22.805	82,098	100.0	10.0	13.25	281022_Discharge_1-1.bt2	281022-Discharge End 1	Li - PRF Test - (Fixed V_{pk})
22	18	4,000	13.33	22.848	82,253	100.0	10.0	13.25	281022_Discharge_1-2.bt2	281022-Discharge End 2	Li - PRF Test - (Fixed V_{pk})
23	18	4,000	13.33	22.815	82,134	100.0	10.0	13.25	291022_Discharge_1-1.bt2	291022-Discharge End 1	Li - PRF Test - (Fixed V_{pk})
24	18	4,000	13.36	22.811	82,120	100.0	10.0	13.23	291022_Discharge_1-2.bt2	291022-Discharge End 2	Li - PRF Test - (Fixed V_{pk})
25	18	5,000	13.50	45.012	162,043	100.0	20.0	13.23	301022_Discharge_1-1.bt2	301022-Discharge End 1	Li - PRF Test - (Fixed V_{pk})
26	18	5,000	13.35	45.052	162,187	100.0	20.0	13.24	301022_Discharge_1-2.bt2	301022-Discharge End 2	Li - PRF Test - (Fixed V_{pk})
27	18	5,000	13.52	44.810	161,316	100.0	20.0	13.23	311022_Discharge_1-1.bt2	311022-Discharge End 1	Li - PRF Test - (Fixed V_{pk})
28	18	5,000	13.50	44.824	161,366	100.0	20.0	13.24	311022_Discharge_1-2.bt2	311022-Discharge End 2	Li - PRF Test - (Fixed V_{pk})
29	18	5,000	13.50	44.619	160,628	100.0	20.0	13.23	011122_Discharge_1-1.bt2	011122-Discharge End 1	Li - PRF Test - (Fixed V_{pk})
30	18	5,000	13.50	44.779	161,204	100.0	20.0	13.23	011122_Discharge_1-2.bt2	011122-Discharge End 2	Li - PRF Test - (Fixed V_{pk})
31	18	5,000	13.50	44.657	160,765	100.0	20.0	13.23	021122_Discharge_1-1.bt2	021122-Discharge End 1	Li - Coil V Test - (Fixed V_{pk})
32	18	5,000	13.45	44.640	160,704	100.0	20.0	13.23	021122_Discharge_1-2.bt2	021122-Discharge End 2	Li - Coil V Test - (Fixed V_{pk})
33	18	5,000	13.57	44.688	160,877	100.0	20.0	13.23	031122_Discharge_1-1.bt2	031122-Discharge End 1	Li - Coil V Test - (Fixed V_{pk})
34	18	5,000	13.26	22.697	81,709	90.0	10.0	13.23	031122_Discharge_1-2.bt2	031122-Discharge End 2	Li - % Discharge Test
35	18	5,000	13.23	22.408	80,669	90.0	10.0	13.17	041122_Discharge_1-1.bt2	041122-Discharge End 1	Li - % Discharge Test
36	18	5,000	13.26	44.365	159,714	90.0	20.0	13.15	041122_Discharge_1-2.bt2	041122-Discharge End 2	Li - % Discharge Test
37	18	5,000	13.24	44.416	159,898	80.0	20.0	13.11	051122_Discharge_1-1.bt2	051122-Discharge End 1	Li - % Discharge Test
38	18	5,000	13.25	33.380	120,168	85.0	15.0	13.19	051122_Discharge_1-2.bt2	051122-Discharge End 2	Li - % Discharge Test
39	7	4,000	13.23	8.729	31,424	90.0	10.0	13.16	061122_Discharge_1-1.bt2	061122-Discharge End 1	Li - HV Test
40	18	5,000	13.25	22.235	80,046	85.0	10.0	13.20	061122_Discharge_1-2.bt2	061122-Discharge End 2	Li - HV Test
41	17	6,000	13.26	81.236	292,450	100.0	40.0	12.47	071122_Discharge_1-1.bt2	071122-Discharge End 1	SLA - HV Test
42	7	3,000	12.49	16.337	58,813	100.0	20.0	12.17	081122_Discharge_1-1.bt2	081122-Discharge End 1	SLA - HV Test
43	7	3,000	13.25	17.675	63,630	95.0	20.0	13.16	081122_Discharge_1-2.bt2	081122-Discharge End 2	Li - HV Test
44	18	6,000	13.26	22.256	80,122	85.0	10.0	13.22	081122_Discharge_1-3.bt2	081122-Discharge End 3	Li - HV Test
45	18	6,000	13.25	22.133	79,679	85.0	10.0	13.20	091122_Discharge_1-1.bt2	091122-Discharge End 1	Li - HV Test
46	18	6,000	13.25	22.628	81,461	85.0	10.0	13.20	091122_Discharge_1-2.bt2	091122-Discharge End 2	Li - Coil V Test
47	7	3,000	12.84	16.943	60,995	100.0	20.0	12.50	121122_Discharge_1-1.bt2	121122-Discharge End 1	SLA - HV Test
48	18	6,000	13.25	20.978	75,521	85.0	10.0	13.20	131122_Discharge_1-1.bt2	131122-Discharge End 1	Li - HV Test
49	17	7,000	13.19	79.736	287,050	100.0	40.0	12.41	141122_Discharge_1-1.bt2	141122-Discharge End 1	SLA - HV Test
50	7	3,000	13.26	17.688	63,677	95.0	20.0	13.17	141122_Discharge_1-2.bt2	141122-Discharge End 2	Li - HV Test
51	18	6,000	13.24	22.171	79,816	85.0	10.0	13.18	151122_Discharge_1-1.bt2	151122-Discharge End 1	Li - HV Test
52	17	7,000	13.33	80.919	291,308	100.0	40.0	12.46	151122_Discharge_1-2.bt2	151122-Discharge End 2	SLA - HV Test
53	7	6,000	13.23	16.988	61,157	95.0	20.0	13.16	191122_Discharge_1-1.bt2	191122-Discharge End 1	Li - HV Test
54	7	3,000	12.82	16.797	60,469	100.0	20.0	12.37	191122_Discharge_1-2.bt2	191122-Discharge End 2	SLA - HV Test
55	7	6,000	13.25	17.031	61,312	95.0	20.0	13.17	201122_Discharge_1-1.bt2	201122-Discharge End 1	Li - HV Test
56	7	6,000	13.25	17.064	61,430	95.0	20.0	13.17	201122_Discharge_1-2.bt2	201122-Discharge End 2	Li - HV Test (No rotor)
57	7	3,000	13.25	17.619	63,428	95.0	20.0	13.17	221122_Discharge_1-1.bt2	221122-Discharge End 1	Li - HV Test
58	18	6,000	13.23	21.986	79,150	85.0	10.0	13.17	221122_Discharge_1-2.bt2	221122-Discharge End 2	Li - HV Test
59	7	3,000	13.25	17.615	63,414	95.0	20.0	13.17	231122_Discharge_1-1.bt2	231122-Discharge End 1	Li - HV Test (No rotor)
60	18	6,000	13.24	21.875	78,750	85.0	10.0	13.17	231122_Discharge_1-2.bt2	231122-Discharge End 2	Li - HV Test (No rotor)
61	18	6,000	13.23	21.255	76,518	85.0	10.0	13.17	011222_Discharge_1-1.bt2	011222-Discharge End 1	Li - HV Test (estimated HV)
62	18	6,000	13.23	22.109	79,592	85.0	10.0	13.17	021222_Discharge_1-1.bt2	021222-Discharge End 1	Li - HV Test (estimated HV)
63	7	3,000	12.79	16.793	60,455	100.0	20.0	12.35	021222_Discharge_1-2.bt2	021222-Discharge End 2	SLA - HV Test (estimated HV)

Notes: [1] Measured after 10 min stabilisation after completion of discharge procedure.

Run Battery (PSU) - Supply

Test No.	PRF (Hz)	%Duty	Circuit V [1] (V)	Circuit Current [2] (A)	Circuit Power (W)	Coil V (V)	I_{tot} [3] (A)	Run Time (s)	$E_{(Supplied)}$ (J) [4]	RDM Imaging/Export File	Comments
1	100	65	12.50	0.098	1.23	13.0	0.90	900	10,486	181022-Current Table 1	
2	108	65	12.50	0.099	1.24	13.0	0.90	900	10,485	181022-Current Table 2	
3	116	65	12.50	0.097	1.21	13.0	0.88	900	10,252	191022-Current Table 1	
4	108	65	12.50	0.095	1.19	12.50	0.78	900	8,775	191022-Current Table 2	
5	108	65	11.48	0.095	1.09	12.00	0.66	900	7,084	201022-Current Table 1	
6	108	65	12.31	0.095	1.17	12.30	0.73	900	8,082	201022-Current Table 2	
7	108	65	12.71	0.096	1.22	12.70	0.83	900	9,488	211022-Current Table 1	
8	108	65	12.50	0.095	1.19	12.50	0.80	900	9,000	211022-Current Table 2	
9	108	65	12.50	0.095	1.19	12.50	0.77	900	8,663	221022-Current Table 1	
10	108	65	12.50	0.095	1.19	12.50	0.80	1,200	12,000	221022-Current Table 2	
11	108	65	12.50	0.095	1.19	12.50	0.78	900	8,775	231022-Current Table 1	
12	108	65	12.50	0.095	1.19	12.50	0.79	900	8,888	231022-Current Table 2	
13	108	65	12.50	0.095	1.19	12.50	0.80	900	9,000	241022-Current Table 1	
14	108	65	12.50	0.095	1.19	12.50	0.77	720	6,930	241022-Current Table 2	
15	108	65	12.50	0.095	1.19	12.50	0.75	600	5,625	251022-Current Table 1	
16	108	65	12.50	0.095	1.19	12.50	0.78	600	5,850	251022-Current Table 2	
17	108	65	12.50	0.073	0.91	26.0	1.81	900	41,467	261022-Current Table 1	
18	108	65	12.50	0.073	0.91	26.0	1.83	900	41,935	261022-Current Table 2	
19	180	65	12.45	0.097	1.21	12.50	0.76	600	5,697	271022-Current Table 1	
20	140	65	12.45	0.097	1.21	12.50	0.72	600	5,397	271022-Current Table 2	
21	120	65	12.45	0.097	1.21	12.50	0.70	600	5,247	281022-Current Table 1	
22	150	65	12.45	0.097	1.21	12.50	0.70	600	5,247	281022-Current Table 2	
23	150	65	12.45	0.097	1.21	12.50	0.70	600	5,247	291022-Current Table 1	
24	220	65	12.45	0.097	1.21	12.50	0.78	600	5,847	291022-Current Table 2	
25	150	65	12.45	0.094	1.17	12.50	0.70	900	7,871	301022-Current Table 1	
26	110	65	12.50	0.090	1.13	12.50	0.78	900	8,775	301022-Current Table 2	
27	160	65	12.50	0.091	1.14	12.50	0.70	900	7,875	311022-Current Table 1	
28	170	65	12.50	0.090	1.13	12.50	0.76	900	8,550	311022-Current Table 2	
29	155	65	12.50	0.090	1.13	12.50	0.69	900	7,763	011122-Current Table 1	
30	145	65	12.50	0.090	1.13	12.50	0.76	900	8,550	011122-Current Table 2	
31	155	65	12.50	0.095	1.19	13.0	0.76	900	8,849	021122-Current Table 1	
32	155	65	11.97	0.089	1.07	12.0	0.54	900	5,830	021122-Current Table 2	
33	155	65	11.51	0.085	0.98	11.5	0.46	900	4,762	031122-Current Table 1	
34	155	65	11.98	0.089	1.07	12.0	0.66	900	7,126	031122-Current Table 2	
35	155	65	11.98	0.089	1.07	12	0.65	600	4,679	041122-Current Table 1	
36	155	65	11.98	0.089	1.07	12.0	0.69	900	7,450	041122-Current Table 2	
37	155	65	11.98	0.089	1.07	12.0	0.68	720	5,874	051122-Current Table 1	
38	155	65	11.98	0.089	1.07	12.0	0.68	720	5,874	051122-Current Table 2	
39	108	65	12.50	0.074	0.93	12.5	0.69	600	5,175	061122-Current Table 1	
40	155	65	12.00	0.069	0.83	12.0	0.60	360	2,592	061122-Current Table 2	
41	180	65	12.51	0.088	1.10	13.0	0.87	600	6,760	071122-Current Table 1	
42	108	65	12.50	0.075	0.94	12.5	0.78	900	8,775	081122-Current Table 1	
43	108	65	12.50	0.075	0.94	12.5	0.71	600	5,325	081122-Current Table 2	
44	155	65	12.00	0.072	0.86	12.0	0.63	600	4,536	081122-Current Table 3	
45	155	65	12.00	0.072	0.86	12.0	0.64	360	2,765	091122-Current Table 1	
46	155	65	12.49	0.077	0.96	12.50	0.75	600	5,625	091122-Current Table 2	
47	108	65	12.48	0.070	0.87	12.50	0.77	900	8,661	121122-Current Table 1	
48	155	65	11.99	0.072	0.86	12.00	0.60	360	2,592	131122-Current Table 1	
49	180	65	12.53	0.11	1.38	13.00	0.87	600	6,755	141122-Current Table 1	
50	108	65	12.50	0.074	0.93	12.50	0.71	600	5,325	141122-Current Table 2	
51	155	65	11.99	0.072	0.86	12.00	0.60	360	2,592	151122-Current Table 1	
52	180	65	12.54	0.083	1.04	13.00	0.85	600	6,607	151122-Current Table 2	
53	108	65	12.47	0.073	0.91	12.50	0.68	600	5,099	191122-Current Table 1	
54	108	65	12.47	0.073	0.91	12.50	0.72	900	8,098	191122-Current Table 2	
55	108	65	12.47	0.073	0.91	12.50	0.77	600	5,774	201122-Current Table 1	
56	108	65	12.47	0.073	0.91	12.50	0.77	660	6,351	201122-Current Table 2	
57	108	65	12.50	0.069	0.86	12.50	0.60	600	4,500	221122-Current Table 1	
58	155	65	11.96	0.093	1.11	12.00	0.51	360	2,202	221122-Current Table 2	
59	108	65	12.49	0.069	0.86	12.50	0.62	600	4,650	231122-Current Table 1	
60	155	65	11.98	0.092	1.10	12.00	0.53	360	2,289	231122-Current Table 2	
61	155	65	11.99	0.093	1.12	12.00	0.55	360	2,376	011222-Current Table 1	
62	155	65	11.00	0.064	0.70	11.00	0.39	360	1,544	021222-Current Table 1	
63	108	65	12.50	0.069	0.86	12.50	0.62	900	6,975	021222-Current Table 2	

Notes: [1] Supply to circuit via Buck Converter [2] Current to circuit excluding coils (MOSFET off)

Notes: [3] Total circuit current including coils. Derived from Mean of RDM data set (seeTable 7 below)

Notes: [4] Total energy to circuit and coils calculated using their different voltages ((Coil V x (Total I - Circuit I) x Time) + (Circuit Power x Time))

Receiving Battery (ID:B41) - Charging (Incremental)

Test No.	Capacity (Ah)	HV (kV)	E Discharge (J)	V_{pk} (V)	Start Volt (V) [1]	Final Volt (V) [2]	dV (V)	CBA Test ID	Screengrab Files	Comments
1	7	1.04	63,904	13.53	13.23	13.31	0.08	181022_ChargeMonitor_1-1.bt2	181022-Charge Monitor End 1	1 x $LiFePO_4$ - PRF Test
2	7	1.04	63,968	13.32	13.20	13.31	0.11	181022_ChargeMonitor_1-2.bt2	181022-Charge Monitor End 2	1 x $LiFePO_4$ - PRF Test
3	7	1.04	64,008	13.33	13.22	13.31	0.09	191022_ChargeMonitor_1-1.bt2	191022-Charge Monitor End 1	1 x $LiFePO_4$ - PRF Test
4	7	1.04	63,968	13.32	13.22	13.31	0.09	191022_ChargeMonitor_1-2.bt2	191022-Charge Monitor End 2	1 x $LiFePO_4$ - Coil V Test
5	7	1.04	63,770	13.33	13.22	13.30	0.08	201022_ChargeMonitor_1-1.bt2	201022-Charge Monitor End 1	1 x $LiFePO_4$ - Coil V Test
6	7	1.04	63,842	13.32	13.21	13.30	0.09	201022_ChargeMonitor_1-2.bt2	201022-Charge Monitor End 2	1 x $LiFePO_4$ - Coil V Test
7	7	1.04	63,673	13.33	13.22	13.31	0.09	211022_ChargeMonitor_1-1.bt2	211022-Charge Monitor End 1	1 x $LiFePO_4$ - Coil V Test
8	7	1.04	31,356	13.21	13.13	13.20	0.07	211022_ChargeMonitor_1-2.bt2	211022-Charge Monitor End 2	1 x $LiFePO_4$ - Coil V Test
9	7	1.04	63,457	13.24	13.14	13.22	0.08	221022_ChargeMonitor_1-1.bt2	221022-Charge Monitor End 1	1 x $LiFePO_4$ - From 90%Ah
10	7	1.04	94,345	13.26	13.13	13.17	0.04	221022_ChargeMonitor_1-2.bt2	221022-Charge Monitor End 2	1 x $LiFePO_4$ - From 90%Ah
11	7	1.04	47,732	13.25	13.19	13.30	0.11	231022_ChargeMonitor_1-1.bt2	231022-Charge Monitor End 1	1 x $LiFePO_4$ - From 90%Ah
12	7	1.04	31,781	13.22	13.15	13.21	0.06	231022_ChargeMonitor_1-2.bt2	231022-Charge Monitor End 2	1 x $LiFePO_4$ - From 80%Ah
13	7	1.04	47,534	13.23	13.13	13.18	0.05	241022_ChargeMonitor_1-1.bt2	241022-Charge Monitor End 1	1 x $LiFePO_4$ - From 80%Ah
14	7	1.04	47,941	13.32	13.25	13.31	0.06	241022_ChargeMonitor_1-2.bt2	241022-Charge Monitor End 2	1 x $LiFePO_4$ - From 100%Ah
15	7	1.04	47,560	13.25	13.18	13.29	0.11	251022_ChargeMonitor_1-1.bt2	251022-Charge Monitor End 1	1 x $LiFePO_4$ - From 90%Ah
16	7	1.04	63,623	13.26	13.18	13.28	0.10	251022_ChargeMonitor_1-2.bt2	251022-Charge Monitor End 2	1 x $LiFePO_4$ - From 95%Ah
17	7	1.04	127,778	26.76	26.43	26.62	0.19	261022_ChargeMonitor_1-1.bt2	261022-Charge Monitor End 1	2 x $LiFePO_4$ - From 100%Ah
18	7	1.04	128,448	26.62	26.44	26.62	0.18	261022_ChargeMonitor_1-2.bt2	261022-Charge Monitor End 2	2 x $LiFePO_4$ - From 100%Ah
19	18	1.04	82,307	13.40	13.26	13.30	0.04	271022_ChargeMonitor_1-1.bt2	271022-Charge Monitor End 1	Li - PRF Test - (Fixed V_{pk})
20	18	1.04	82,289	13.40	13.26	13.30	0.04	271022_ChargeMonitor_1-2.bt2	271022-Charge Monitor End 2	Li - PRF Test - (Fixed V_{pk})
21	18	1.04	82,098	13.40	13.25	13.29	0.04	281022_ChargeMonitor_1-1.bt2	281022-Charge Monitor End 1	Li - PRF Test - (Fixed V_{pk})
22	18	1.04	82,253	13.40	13.25	13.30	0.05	281022_ChargeMonitor_1-2.bt2	281022-Charge Monitor End 2	Li - PRF Test - (Fixed V_{pk})
23	18	1.04	82,134	13.40	13.25	13.30	0.05	291022_ChargeMonitor_1-1.bt2	291022-Charge Monitor End 1	Li - PRF Test - (Fixed V_{pk})
24	18	1.04	82,120	13.40	13.25	13.30	0.05	291022_ChargeMonitor_1-2.bt2	291022-Charge Monitor End 2	Li - PRF Test - (Fixed V_{pk})
25	18	1.04	162,043	13.40	13.23	13.30	0.07	301022_ChargeMonitor_1-1.bt2	301022-Charge Monitor End 1	Li - PRF Test - (Fixed V_{pk})
26	18	1.04	162,187	13.40	13.24	13.30	0.06	301022_ChargeMonitor_1-2.bt2	301022-Charge Monitor End 2	Li - PRF Test - (Fixed V_{pk})
27	18	1.04	161,316	13.40	13.23	13.30	0.07	311022_ChargeMonitor_1-1.bt2	311022-Charge Monitor End 1	Li - PRF Test - (Fixed V_{pk})
28	18	1.04	161,366	13.40	13.24	13.30	0.06	311022_ChargeMonitor_1-2.bt2	311022-Charge Monitor End 2	Li - PRF Test - (Fixed V_{pk})
29	18	1.04	160,628	13.40	13.23	13.30	0.07	011122_ChargeMonitor_1-1.bt2	011122-Charge Monitor End 1	Li - PRF Test - (Fixed V_{pk})
30	18	1.04	161,204	13.40	13.23	13.30	0.07	011122_ChargeMonitor_1-2.bt2	011122-Charge Monitor End 2	Li - PRF Test - (Fixed V_{pk})
31	18	1.04	160,765	13.40	13.23	13.30	0.07	021122_ChargeMonitor_1-1.bt2	021122-Charge Monitor End 1	Li - Coil V Test - (Fixed V_{pk})
32	18	1.04	160,704	13.40	13.23	13.30	0.07	021122_ChargeMonitor_1-2.bt2	021122-Charge Monitor End 2	Li - Coil V Test - (Fixed V_{pk})
33	18	1.04	160,877	13.40	13.23	13.30	0.07	031122_ChargeMonitor_1-1.bt2	031122-Charge Monitor End 1	Li - Coil V Test - (Fixed V_{pk})
34	18	1.04	81,709	13.26	13.23	13.30	0.07	031122_ChargeMonitor_1-2.bt2	031122-Charge Monitor End 2	Li - % Discharge Test
35	18	1.04	80,669	13.23	13.17	13.27	0.10	041122_ChargeMonitor_1-1.bt2	041122-Charge Monitor End 1	Li - % Discharge Test
36	18	1.04	159,714	13.26	13.15	13.24	0.09	041122_ChargeMonitor_1-2.bt2	041122-Charge Monitor End 2	Li - % Discharge Test
37	18	1.04	159,898	13.24	13.11	13.16	0.05	051122_ChargeMonitor_1-1.bt2	051122-Charge Monitor End 1	Li - % Discharge Test
38	18	1.04	120,168	13.25	13.19	13.27	0.08	051122_ChargeMonitor_1-2.bt2	051122-Charge Monitor End 2	Li - % Discharge Test
39	7	1.10	31,424	13.23	13.16	13.28	0.12	061122_ChargeMonitor_1-1.bt2	061122-Charge Monitor End 1	Li - HV Test
40	18	1.10	80,046	13.25	13.20	13.27	0.07	061122_ChargeMonitor_1-2.bt2	061122-Charge Monitor End 2	Li - HV Test
41	17	1.10	292,450	13.26	12.47	12.62	0.15	071122_ChargeMonitor_1-1.bt2	071122-Charge Monitor End 1	SLA - HV Test
42	7	1.10	58,813	12.49	12.17	12.37	0.20	081122_ChargeMonitor_1-1.bt2	081122-Charge Monitor End 1	SLA - HV Test
43	7	1.10	63,630	13.25	13.16	13.26	0.10	081122_ChargeMonitor_1-2.bt2	081122-Charge Monitor End 2	Li - HV Test
44	18	1.10	80,122	13.26	13.22	13.30	0.08	081122_ChargeMonitor_1-3.bt2	081122-Charge Monitor End 3	Li - HV Test
45	18	1.10	79,679	13.25	13.20	13.29	0.09	091122_ChargeMonitor_1-1.bt2	091122-Charge Monitor End 1	Li - HV Test
46	18	1.10	81,461	13.25	13.20	13.29	0.09	091122_ChargeMonitor_1-2.bt2	091122-Charge Monitor End 2	Li - Coil V Test
47	7	1.53	60,995	12.84	12.50	12.58	0.08	121122_ChargeMonitor_1-1.bt2	121122-Charge Monitor End 1	SLA - HV Test
48	18	1.53	75,521	13.25	13.20	13.29	0.09	131122_ChargeMonitor_1-1.bt2	131122-Charge Monitor End 1	Li - HV Test
49	17	1.53	287,050	13.19	12.41	12.57	0.16	141122_ChargeMonitor_1-1.bt2	141122-Charge Monitor End 1	SLA - HV Test
50	7	1.53	63,677	13.26	13.17	13.27	0.10	141122_ChargeMonitor_1-2.bt2	141122-Charge Monitor End 2	Li - HV Test
51	18	1.70	79,816	13.24	13.18	13.28	0.10	151122_ChargeMonitor_1-1.bt2	151122-Charge Monitor End 1	Li - HV Test
52	17	1.70	291,308	13.33	12.46	12.61	0.15	151122_ChargeMonitor_1-2.bt2	151122-Charge Monitor End 2	SLA - HV Test
53	7	1.70	61,157	13.23	13.16	13.27	0.11	191122_ChargeMonitor_1-1.bt2	191122-Charge Monitor End 1	Li - HV Test
54	7	1.70	60,469	12.62	12.37	12.50	0.13	191122_ChargeMonitor_1-2.bt2	191122-Charge Monitor End 2	SLA - HV Test
55	7	1.70	61,312	13.25	13.17	13.27	0.10	201122_ChargeMonitor_1-1.bt2	201122-Charge Monitor End 1	Li- Test
56	7	1.70	61,430	13.25	13.17	13.28	0.11	201122_ChargeMonitor_1-2.bt2	201122-Charge Monitor End 2	Li- Test (No rotor)
57	7	1.70	63,428	13.25	13.17	13.28	0.11	221122_ChargeMonitor_1-1.bt2	221122-Charge Monitor End 1	Li- Test
58	18	1.70	79,150	13.23	13.17	13.27	0.10	221122_ChargeMonitor_1-2.bt2	221122-Charge Monitor End 2	Li- Test
59	7	1.70	63,414	13.25	13.17	13.27	0.10	231122_ChargeMonitor_1-1.bt2	231122-Charge Monitor End 1	Li- Test (No rotor)
60	18	1.70	78,750	13.24	13.17	13.28	0.11	231122_ChargeMonitor_1-2.bt2	231122-Charge Monitor End 2	Li- Test (No rotor)
61	18	0.5	76,518	13.23	13.17	13.27	0.10	011222_ChargeMonitor_1-1.bt2	011222-Charge Monitor End 1	Li - HV Test (estimated HV)
62	18	0.5	79,592	13.23	13.17	13.27	0.10	021222_ChargeMonitor_1-1.bt2	021222-Charge Monitor End 1	Li - HV Test (estimated HV)
63	7	0.5	60,455	12.79	12.35	12.50	0.15	021222_ChargeMonitor_1-2.bt2	021222-Charge Monitor End 2	Li - HV Test (estimated HV)

Notes: [1] Up to test 24, rested battery voltage after mains charge and at start of 'Discharge' stage - used as reference value V_{pk} for full charge state. Measured with CBA. From test 25 onwards, normalised using the initial voltage drop, with a fixed energy discharge, added to the final voltage after the discharge stage

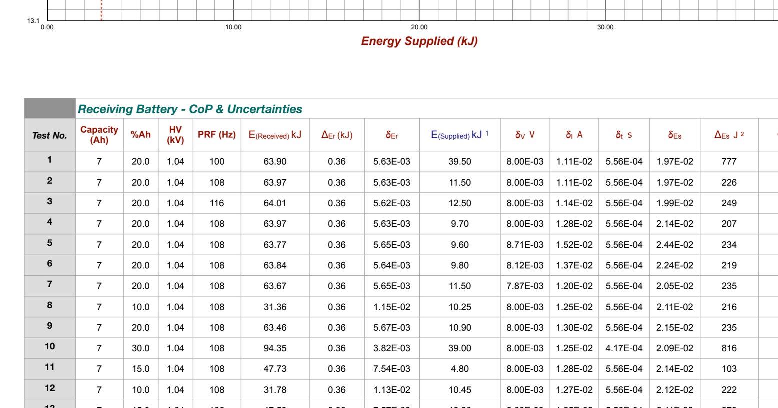
Notes: [2] Measured with CBA after charge stabilisation

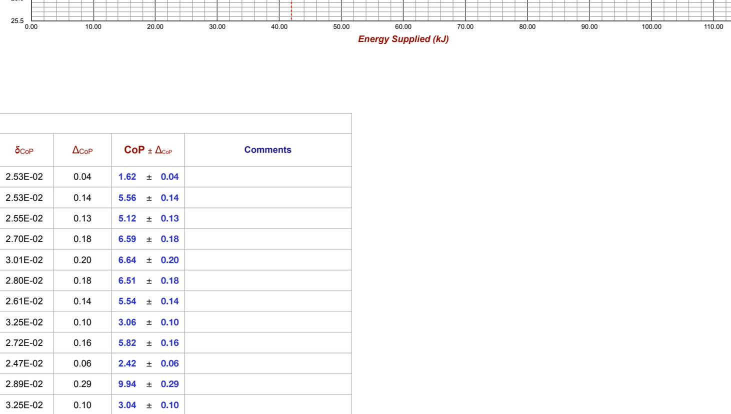
Interpolation/Extrapolation Plot Data

$E_{(Supplied)}$ kJ	'Rec' Batt V	$E_{(Supplied)}$ kJ	'Rec' Batt V	$E_{(Supplied)}$ kJ	'Rec' Batt V
0.00	13.16				
4.88	13.26				
V_{pk}	13.24				
V	12.00				

Interpolation/Extrapolation Plot Data-1

$E_{(Supplied)}$ kJ	'Rec' Batt V	$E_{(Supplied)}$ kJ	'Rec' Batt V	$E_{(Supplied)}$ kJ	'Rec' Batt V
0.00	26.44				
41.94	26.62				
V_{pk}	26.62				





Receiving Battery - CoP & Uncertainties

Test No.	Capacity (Ah)	%Ah	HV (kV)	PRF (Hz)	$E_{(Received)}$ kJ	Δ_{Er} (kJ)	δ_{Er}	$E_{(Supplied)}$ kJ [1]	δ_V V	δ_I A	δ_t s	δ_{Es}	Δ_{Es} J [2]	CoP	δ_{CoP}	Δ_{CoP}	CoP ± Δ_{CoP}	Comments
1	7	20.0	1.04	100	63.90	0.36	5.63E-03	39.50	8.00E-03	1.11E-02	5.56E-04	1.97E-02	777	1.62	2.53E-02	0.04	1.62 ± 0.04	
2	7	20.0	1.04	108	63.97	0.36	5.63E-03	11.50	8.00E-03	1.11E-02	5.56E-04	1.97E-02	226	5.56	2.53E-02	0.14	5.56 ± 0.14	
3	7	20.0	1.04	116	64.01	0.36	5.62E-03	12.50	8.00E-03	1.14E-02	5.56E-04	1.99E-02	249	5.12	2.55E-02	0.13	5.12 ± 0.13	
4	7	20.0	1.04	108	63.97	0.36	5.63E-03	9.70	8.00E-03	1.28E-02	5.56E-04	2.14E-02	207	6.59	2.70E-02	0.18	6.59 ± 0.18	
5	7	20.0	1.04	108	63.77	0.36	5.65E-03	9.60	8.71E-03	1.52E-02	5.56E-04	2.44E-02	234	6.64	3.01E-02	0.20	6.64 ± 0.20	
6	7	20.0	1.04	108	63.84	0.36	5.64E-03	9.80	8.12E-03	1.37E-02	5.56E-04	2.24E-02	219	6.51	2.80E-02	0.18	6.51 ± 0.18	
7	7	20.0	1.04	108	63.67	0.36	5.65E-03	11.50	7.87E-03	1.20E-02	5.56E-04	2.05E-02	235	5.54	2.61E-02	0.14	5.54 ± 0.14	
8	7	10.0	1.04	108	31.36	0.36	1.15E-02	10.25	8.00E-03	1.25E-02	5.56E-04	2.11E-02	216	3.06	3.25E-02	0.10	3.06 ± 0.10	
9	7	20.0	1.04	108	63.46	0.36	5.67E-03	10.90	8.00E-03	1.30E-02	5.56E-04	2.15E-02	235	5.82	2.72E-02	0.16	5.82 ± 0.16	
10	7	30.0	1.04	108	94.35	0.36	3.82E-03	39.00	8.00E-03	1.25E-02	4.17E-04	2.09E-02	816	2.42	2.47E-02	0.06	2.42 ± 0.06	
11	7	15.0	1.04	108	47.73	0.36	7.54E-03	4.80	8.00E-03	1.28E-02	5.56E-04	2.14E-02	103	9.94	2.89E-02	0.29	9.94 ± 0.29	
12	7	10.0	1.04	108	31.78	0.36	1.13E-02	10.45	8.00E-03	1.27E-02	5.56E-04	2.12E-02	222	3.04	3.25E-02	0.10	3.04 ± 0.10	
13	7	15.0	1.04	108	47.53	0.36	7.57E-03	18.00	8.00E-03	1.25E-02	5.56E-04	2.11E-02	379	2.64	2.86E-02	0.08	2.64 ± 0.08	
14	7	15.0	1.04	108	47.94	0.36	7.51E-03	8.15	8.00E-03	1.30E-02	6.94E-04	2.17E-02	177	5.88	2.92E-02	0.17	5.88 ± 0.17	
15	7	15.0	1.04	108	47.56	0.36	7.57E-03	3.55	8.00E-03	1.33E-02	8.33E-04	2.22E-02	79	13.40	2.97E-02	0.40	13.40 ± 0.40	
16	7	20.0	1.04	108	63.62	0.36	5.66E-03	4.70	8.00E-03	1.28E-02	8.33E-04	2.17E-02	102	13.54	2.73E-02	0.37	13.54 ± 0.37	
17	7	20.0	1.04	108	127.78	0.36	2.82E-03	72.00	8.00E-03	5.52E-03	5.56E-04	1.41E-02	1014	1.77	1.69E-02	0.03	1.77 ± 0.03	
18	7	20.0	1.04	108	128.45	0.36	2.80E-03	41.95	8.00E-03	5.46E-03	5.56E-04	1.40E-02	588	3.06	1.68E-02	0.05	3.06 ± 0.05	
19	18	10.0	1.04	180	82.31	0.36	4.37E-03	24.10	8.03E-03	1.32E-02	8.33E-04	2.20E-02	531	3.42	2.64E-02	0.09	3.42 ± 0.09	
20	18	10.0	1.04	140	82.29	0.36	4.37E-03	9.40	8.03E-03	1.39E-02	8.33E-04	2.28E-02	214	8.75	2.71E-02	0.24	8.75 ± 0.24	
21	18	10.0	1.04	120	82.10	0.36	4.39E-03	22.40	8.03E-03	1.43E-02	8.33E-04	2.32E-02	519	3.67	2.75E-02	0.10	3.67 ± 0.10	
22	18	10.0	1.04	150	82.25	0.36	4.38E-03	8.60	8.03E-03	1.43E-02	8.33E-04	2.32E-02	199	9.56	2.75E-02	0.26	9.56 ± 0.26	
23	18	10.0	1.04	150	82.13	0.36	4.38E-03	29.40	8.03E-03	1.43E-02	8.33E-04	2.32E-02	681	2.79	2.75E-02	0.08	2.79 ± 0.08	
24	18	10.0	1.04	220	82.12	0.36	4.38E-03	12.00	8.03E-03	1.28E-02	8.33E-04	2.17E-02	260	6.84	2.61E-02	0.18	6.84 ± 0.18	
25	18	20.0	1.04	150	162.04	0.36	2.22E-03	19.00	8.03E-03	1.43E-02	5.56E-04	2.29E-02	435	8.53	2.51E-02	0.21	8.53 ± 0.21	
26	18	20.0	1.04	110	162.19	0.36	2.22E-03	23.50	8.00E-03	1.28E-02	5.56E-04	2.14E-02	502	6.90	2.36E-02	0.16	6.90 ± 0.16	
27	18	20.0	1.04	160	161.32	0.36	2.23E-03	19.20	8.00E-03	1.43E-02	5.56E-04	2.28E-02	439	8.40	2.51E-02	0.21	8.40 ± 0.21	
28	18	20.0	1.04	170	161.37	0.36	2.23E-03	22.90	8.00E-03	1.32E-02	5.56E-04	2.17E-02	497	7.05	2.39E-02	0.17	7.05 ± 0.17	
29	18	20.0	1.04	155	160.63	0.36	2.24E-03	19.00	8.00E-03	1.45E-02	5.56E-04	2.30E-02	438	8.45	2.53E-02	0.21	8.45 ± 0.21	
30	18	20.0	1.04	145	161.20	0.36	2.23E-03	20.80	8.00E-03	1.32E-02	5.56E-04	2.17E-02	452	7.75	2.39E-02	0.19	7.75 ± 0.19	
31	18	20.0	1.04	155	160.77	0.36	2.24E-03	21.60	8.00E-03	1.32E-02	5.56E-04	2.17E-02	469	7.44	2.40E-02	0.18	7.44 ± 0.18	
32	18	20.0	1.04	155	160.70	0.36	2.24E-03	14.25	8.35E-03	1.85E-02	5.56E-04	2.74E-02	391	11.28	2.97E-02	0.33	11.28 ± 0.33	
33	18	20.0	1.04	155	160.88	0.36	2.24E-03	11.15	8.69E-03	2.17E-02	5.56E-04	3.10E-02	345	14.43	3.32E-02	0.48	14.43 ± 0.48	
34	18	10.0	1.04	155	81.71	0.36	4.41E-03	3.00	8.35E-03	1.52E-02	5.56E-04	2.41E-02	72	27.24	2.85E-02	0.78	27.24 ± 0.78	
35	18	10.0	1.04	155	80.67	0.36	4.46E-03	2.80	8.35E-03	1.54E-02	8.33E-04	2.46E-02	69	28.81	2.90E-02	0.84	28.81 ± 0.84	
36	18	20.0	1.04	155	159.71	0.36	2.25E-03	6.60	8.35E-03	1.45E-02	5.56E-04	2.34E-02	154	24.20	2.56E-02	0.62	24.20 ± 0.62	
37	18	20.0	1.04	155	159.90	0.36	2.25E-03	15.40	8.35E-03	1.47E-02	6.94E-04	2.37E-02	366	10.38	2.60E-02	0.27	10.38 ± 0.27	
38	18	15.0	1.04	155	120.17	0.36	3.00E-03	4.45	8.35E-03	1.47E-02	6.94E-04	2.37E-02	106	27.00	2.67E-02	0.72	27.00 ± 0.72	
39	7	10.0	1.10	108	31.42	0.36	1.15E-02	2.95	8.00E-03	1.45E-02	8.33E-04	2.33E-02	69	10.65	3.48E-02	0.37	10.65 ± 0.37	
40	18	10.0	1.10	155	80.05	0.36	4.50E-03	1.80	8.33E-03	1.67E-02	1.39E-03	2.64E-02	48	44.47	3.09E-02	1.37	44.47 ± 1.37	
41	17	40.0	1.10	180	292.45	0.36	1.23E-03	35.80	7.99E-03	1.15E-02	8.33E-04	2.03E-02	727	8.17	2.16E-02	0.18	8.17 ± 0.18	
42	7	20.0	1.10	108	58.81	0.36	6.12E-03	14.00	8.00E-03	1.28E-02	5.56E-04	2.14E-02	299	4.20	2.75E-02	0.12	4.20 ± 0.12	
43	7	20.0	1.10	108	63.63	0.36	5.66E-03	4.80	8.00E-03	1.41E-02	8.33E-04	2.29E-02	110	13.26	2.86E-02	0.38	13.26 ± 0.38	
44	18	10.0	1.10	155	80.12	0.36	4.49E-03	2.30	8.33E-03	1.59E-02	8.33E-04	2.50E-02	58	34.84	2.95E-02	1.03	34.84 ± 1.03	
45	18	10.0	1.10	155	79.68	0.36	4.52E-03	1.50	8.33E-03	1.56E-02	1.39E-03	2.53E-02	38	53.12	2.99E-02	1.59	53.12 ± 1.59	
46	18	10.0	1.10	155	81.46	0.36	4.42E-03	3.10	8.01E-03	1.33E-02	8.33E-04	2.22E-02	69	26.28	2.66E-02	0.70	26.28 ± 0.70	
47	7	20.0	1.53	108	60.99	0.36	5.90E-03	28.00	8.01E-03	1.30E-02	5.56E-04	2.16E-02	604	2.18	2.75E-02	0.06	2.18 ± 0.06	
48	18	10.0	1.53	155	75.52	0.36	4.77E-03	1.40	8.34E-03	1.67E-02	1.39E-03	2.64E-02	37	53.94	3.12E-02	1.68	53.94 ± 1.68	
49	17	40.0	1.53	180	287.05	0.36	1.25E-03	32.00	7.98E-03	1.15E-02	8.33E-04	2.03E-02	650	8.97	2.16E-02	0.19	8.97 ± 0.19	
50	7	20.0	1.53	108	63.68	0.36	5.65E-03	4.40	8.00E-03	1.41E-02	8.33E-04	2.29E-02	101	14.47	2.86E-02	0.41	14.47 ± 0.41	
51	18	10.0	1.70	155	79.82	0.36	4.51E-03	1.50	8.34E-03	1.67E-02	1.39E-03	2.64E-02	40	53.21	3.09E-02	1.64	53.21 ± 1.64	
52	17	40.0	1.70	180	291.31	0.36	1.24E-03	38.50	7.97E-03	1.18E-02	8.33E-04	2.06E-02	792	7.57	2.18E-02	0.17	7.57 ± 0.17	
53	7	20.0	1.70	108	61.16	0.36	5.89E-03	4.25	8.02E-03	1.47E-02	8.33E-04	2.36E-02	100	14.39	2.94E-02	0.42	14.39 ± 0.42	
54	7	20.0	1.70	108	60.47	0.36	5.95E-03	28.00	8.02E-03	1.39E-02	5.56E-04	2.25E-02	629	2.16	2.84E-02	0.06	2.16 ± 0.06	
55	7	20.0	1.70	108	61.31	0.36	5.87E-03	4.55	8.02E-03	1.30E-02	8.33E-04	2.18E-02	99	13.48	2.77E-02	0.37	13.48 ± 0.37	
56	7	20.0	1.70	108	61.43	0.36	5.86E-03	4.55	8.02E-03	1.30E-02	7.58E-04	2.18E-02	99	13.50	2.76E-02	0.37	13.50 ± 0.37	
57	7	20.0	1.70	108	63.43	0.36	5.68E-03	3.25	8.00E-03	1.67E-02	8.33E-04	2.55E-02	83	19.52	3.12E-02	0.61	19.52 ± 0.61	
58	18	10.0	1.70	155	79.15	0.36	4.55E-03	1.30	8.36E-03	1.96E-02	1.39E-03	2.94E-02	38	60.88	3.39E-02	2.06	60.88 ± 2.06	
59	7	20.0	1.70	108	63.41	0.36	5.68E-03	3.70	8.01E-03	1.61E-02	8.33E-04	2.50E-02	92	17.14	3.06E-02	0.53	17.14 ± 0.53	
60	18	10.0	1.70	155	78.75	0.36	4.57E-03	1.50	8.35E-03	1.89E-02	1.39E-03	2.86E-02	43	52.50	3.32E-02	1.74	52.50 ± 1.74	
61	18	10.0	0.5	155	76.52	0.36	4.70E-03	1.40	8.34E-03	1.82E-02	1.39E-03	2.79E-02	39	54.66	3.26E-02	1.78	54.66 ± 1.78	
62	18	10.0	0.5	155	79.59	0.36	4.52E-03	0.90	9.09E-03	2.56E-02	1.39E-03	3.61E-02	33	88.44	4.06E-02	3.59	88.44 ± 3.59	
63	7	20.0	0.5	108	60.45	0.36	5.95E-03	20.50	8.00E-03	1.61E-02	5.56E-04	2.47E-02	506	2.95	3.06E-02	0.09	2.95 ± 0.09	

Equations: $E_{(Supplied)} = V_{(av)} \cdot I_{(av)} \cdot t_{(Vpk)}$ J ; $\delta_V = \Delta_V / V$, $\delta_I = \Delta_I / I$, $\delta_t = \Delta_t / t$; $\delta_{Es} = (\delta_V + \delta_I + \delta_t) = \Delta_{Es} / E_{(Supplied)}$; $\Delta_{Es} = (\delta_V + \delta_I + \delta_t) \times E_{(Supplied)}$ J

Equations: $\delta_{Er} = \Delta_{Er} / E_{(Received)}$; CoP = $E_{(Received)} / E_{(Supplied)}$; $\delta_{CoP} = (\delta_{Er} + \delta_{Es})$; $\delta_{CoP} = \Delta_{CoP} / CoP$: $\Delta_{CoP} = \delta_{CoP} \times CoP$

Notes: [1] Derived from extrapolation or interpolation of Graph 1 - 'Receiving' battery voltage vs '$E_{(Supplied)}$'

Notes: [2] The uncertainty value Δ_{Es} used is the larger computational value rather than the graphical value of 100J (0.1kJ) derived from plotting and reading the graph of 'Receiving' battery voltage vs '$E_{(Supplied)}$'

Summary Table

Test No	Capacity (Ah)	Coil V (V)	PRF (Hz)	%Duty	HV (kV)	$V_{(pk)}$	Energy Returned to battery (kJ) [1]	Energy Supplied to Generator (kJ) [2]	CoP	Energy Available (kJ) [3]	Time Taken (min) [4]	Max Power available (W) [5]	Comments
1	7	13.0	100	65	1.04	13.53	63.90	39.50	1.62 ± 0.04	24.40	56.25	7.2	1 x $LiFePO_4$ - PRF Test
2	7	13.0	108	65	1.04	13.32	63.97	11.50	5.56 ± 0.14	52.47	16.36	53.4	1 x $LiFePO_4$ - PRF Test
3	7	13.0	116	65	1.04	13.33	64.01	12.50	5.12 ± 0.13	51.51	18.33	46.8	1 x $LiFePO_4$ - PRF Test
4	7	12.50	108	65	1.04	13.32	63.97	9.70	6.59 ± 0.18	54.27	16.67	54.3	1 x $LiFePO_4$ - Coil V Test
5	7	12.00	108	65	1.04	13.33	63.77	9.60	6.64 ± 0.20	54.17	20.63	43.8	1 x $LiFePO_4$ - Coil V Test
6	7	12.30	108	65	1.04	13.32	63.84	9.80	6.51 ± 0.18	54.04	18.33	49.1	1 x $LiFePO_4$ - Coil V Test
7	7	12.70	108	65	1.04	13.33	63.67	11.50	5.54 ± 0.14	52.17	18.33	47.4	1 x $LiFePO_4$ - Coil V Test
8	7	12.50	108	65	1.04	13.21	31.36	10.25	3.06 ± 0.10	21.11	17.14	20.5	1 x $LiFePO_4$ - Discharge Test
9	7	12.50	108	65	1.04	13.24	63.46	10.90	5.82 ± 0.16	52.56	18.75	46.7	1 x $LiFePO_4$ - Discharge Test
10	7	12.50	108	65	1.04	13.26	94.35	39.00	2.42 ± 0.06	55.35	65.00	14.2	1 x $LiFePO_4$ - Discharge Test
11	7	12.50	108	65	1.04	13.25	47.73	4.80	9.94 ± 0.29	42.93	8.18	87.5	1 x $LiFePO_4$ - Discharge Test
12	7	12.50	108	65	1.04	13.22	31.78	10.45	3.04 ± 0.10	21.33	17.50	20.3	1 x $LiFePO_4$ - Discharge Test
13	7	12.50	108	65	1.04	13.23	47.53	18.00	2.64 ± 0.08	29.53	30.00	16.4	1 x $LiFePO_4$ - Discharge Test
14	7	12.50	108	65	1.04	13.32	47.94	8.15	5.88 ± 0.17	39.79	14.00	47.4	1 x $LiFePO_4$ - Discharge Test
15	7	12.50	108	65	1.04	13.25	47.56	3.55	13.40 ± 0.40	44.01	6.36	115.3	1 x $LiFePO_4$ - Discharge Test
16	7	12.50	108	65	1.04	13.26	63.62	4.70	13.54 ± 0.37	58.92	8.00	122.8	1 x $LiFePO_4$ - Discharge Test
17	7	26.0	108	65	1.04	26.76	127.78	72.00	1.77 ± 0.03	55.78	26.05	35.7	2 x $LiFePO_4$ - PRF Test
18	7	26.0	108	65	1.04	26.62	128.45	41.95	3.06 ± 0.05	86.50	15.00	96.1	2 x $LiFePO_4$ - PRF Test
19	18	12.50	180	65	1.04	13.40	82.31	24.10	3.42 ± 0.09	58.21	35.00	27.7	Li - PRF Test - (Fixed V_{pk})
20	18	12.50	140	65	1.04	13.40	82.29	9.40	8.75 ± 0.24	72.89	35.00	34.7	Li - PRF Test - (Fixed V_{pk})
21	18	12.50	120	65	1.04	13.40	82.10	22.40	3.67 ± 0.10	59.70	37.50	26.5	Li - PRF Test - (Fixed V_{pk})
22	18	12.50	150	65	1.04	13.40	82.25	8.60	9.56 ± 0.26	73.65	30.00	40.9	Li - PRF Test - (Fixed V_{pk})
23	18	12.50	150	65	1.04	13.40	82.13	29.40	2.79 ± 0.08	52.73	30.00	29.3	Li - PRF Test - (Fixed V_{pk})
24	18	12.50	220	65	1.04	13.40	82.12	12.00	6.84 ± 0.18	70.12	30.00	39.0	Li - PRF Test - (Fixed V_{pk})
25	18	12.50	150	65	1.04	13.40	162.04	19.00	8.53 ± 0.21	143.04	36.43	65.4	Li - PRF Test - (Fixed V_{pk})
26	18	12.50	110	65	1.04	13.40	162.19	23.50	6.90 ± 0.16	138.69	40.00	57.8	Li - PRF Test - (Fixed V_{pk})
27	18	12.50	160	65	1.04	13.40	161.32	19.20	8.40 ± 0.21	142.12	36.43	65.0	Li - PRF Test - (Fixed V_{pk})
28	18	12.50	170	65	1.04	13.40	161.37	22.90	7.05 ± 0.17	138.47	40.00	57.7	Li - PRF Test - (Fixed V_{pk})
29	18	12.50	155	65	1.04	13.40	160.63	19.00	8.45 ± 0.21	141.63	36.43	64.8	Li - PRF Test - (Fixed V_{pk})
30	18	12.50	145	65	1.04	13.40	161.20	20.80	7.75 ± 0.19	140.40	36.43	64.2	Li - PRF Test - (Fixed V_{pk})
31	18	13.0	155	65	1.04	13.40	160.77	21.60	7.44 ± 0.18	139.17	36.43	63.7	Li - Coil V Test - (Fixed V_{pk})
32	18	12.0	155	65	1.04	13.40	160.70	14.25	11.28 ± 0.33	146.45	36.43	67.0	Li - Coil V Test - (Fixed V_{pk})
33	18	11.5	155	65	1.04	13.40	160.88	11.15	14.43 ± 0.48	149.73	36.43	68.5	Li - Coil V Test - (Fixed V_{pk})
34	18	12.0	155	65	1.04	13.26	81.71	3.00	27.24 ± 0.78	78.71	6.43	204.1	Li - % Discharge Test
35	18	12	155	65	1.04	13.23	80.67	2.80	28.81 ± 0.84	77.87	6.00	216.3	Li - % Discharge Test
36	18	12.0	155	65	1.04	13.26	159.71	6.60	24.20 ± 0.62	153.11	18.33	139.2	Li - % Discharge Test
37	18	12.0	155	65	1.04	13.24	159.90	15.40	10.38 ± 0.27	144.50	31.20	77.2	Li - % Discharge Test
38	18	12.0	155	65	1.04	13.25	120.17	4.45	27.00 ± 0.72	115.72	9.00	214.3	Li - % Discharge Test
39	7	12.5	108	65	1.10	13.23	31.42	2.95	10.65 ± 0.37	28.47	5.83	81.4	Li - HV Test
40	18	12.0	155	65	1.10	13.25	80.05	1.80	44.47 ± 1.37	78.25	4.29	304.3	Li - HV Test
41	17	13.0	180	65	1.10	13.26	292.45	35.80	8.17 ± 0.18	256.65	52.67	81.2	SLA - HV Test
42	7	12.5	108	65	1.10	12.49	58.81	14.00	4.20 ± 0.12	44.81	24.00	31.1	SLA - HV Test
43	7	12.5	108	65	1.10	13.25	63.63	4.80	13.26 ± 0.38	58.83	9.00	108.9	Li - HV Test
44	18	12.0	155	65	1.10	13.26	80.12	2.30	34.84 ± 1.03	77.82	5.00	259.4	Li - HV Test
45	18	12.0	155	65	1.10	13.25	79.68	1.50	53.12 ± 1.59	78.18	3.33	390.9	Li - HV Test
46	18	12.50	155	65	1.10	13.25	81.46	3.10	26.28 ± 0.70	78.36	5.56	235.1	Li - Coil V Test
47	7	12.50	108	65	1.53	12.84	60.99	28.00	2.18 ± 0.06	32.99	63.75	8.6	SLA - HV Test
48	18	12.00	155	65	1.53	13.25	75.52	1.40	53.94 ± 1.68	74.12	3.33	370.6	Li - HV Test
49	17	13.00	180	65	1.53	13.19	287.05	32.00	8.97 ± 0.19	255.05	48.75	87.2	SLA - HV Test
50	7	12.50	108	65	1.53	13.26	63.68	4.40	14.47 ± 0.41	59.28	8.18	120.7	Li - HV Test
51	18	12.00	155	65	1.70	13.24	79.82	1.50	53.21 ± 1.64	78.32	3.60	362.6	Li - HV Test
52	17	13.00	180	65	1.70	13.33	291.31	38.50	7.57 ± 0.17	252.81	58.00	72.6	SLA - HV Test
53	7	12.50	108	65	1.70	13.23	61.16	4.25	14.39 ± 0.42	56.91	6.36	149.0	Li - HV Test
54	7	12.50	108	65	1.70	12.82	60.47	28.00	2.16 ± 0.06	32.47	51.92	10.4	SLA - HV Test
55	7	12.50	108	65	1.70	13.25	61.31	4.55	13.48 ± 0.37	56.76	8.00	118.3	Li - HV Test
56	7	12.50	108	65	1.70	13.25	61.43	4.55	13.50 ± 0.37	56.88	8.00	118.5	Li - HV Test (No rotor)
57	7	12.50	108	65	1.70	13.25	63.43	3.25	19.52 ± 0.61	60.18	7.27	137.9	Li - HV Test
58	18	12.00	155	65	1.70	13.23	79.15	1.30	60.88 ± 2.06	77.85	3.60	360.4	Li - HV Test
59	7	12.50	108	65	1.70	13.25	63.41	3.70	17.14 ± 0.53	59.71	8.00	124.4	Li - HV Test (No rotor)
60	18	12.00	155	65	1.70	13.24	78.75	1.50	52.50 ± 1.74	77.25	3.82	337.2	Li - HV Test (No rotor)
61	18	12.00	155	65	0.5	13.23	76.52	1.40	54.66 ± 1.78	75.12	3.60	347.8	Li - HV Test
62	18	11.00	155	65	0.5	13.23	79.59	0.90	88.44 ± 3.59	78.69	3.60	364.3	Li - HV Test
63	7	12.50	108	65	0.5	12.79	60.45	20.50	2.95 ± 0.09	39.95	44.00	15.1	SLA - HV Test

Notes: [1] Equivalent to energy discharged from 'Receiving' battery [2] Extrapolated from 'Run' battery data during charging procedure

Notes: [3] Energy available from 'Run' battery for an external load when battery swapping enabled to maintain battery charge level. Calculated as 'Energy Returned to Batt.' [1] - 'Energy Supplied to Gen.' [2]

Notes: [4] Time taken to replace discharged energy to 'Receiving' battery. Calculated from the proportion of the time taken to reach the final charging voltage compared to V_{pk} and equals ((Run time + (Run time x (V_{pk} - V_{fin})) / (V_{fin} - V_{start}))) / 60

Notes: [5] Available power for an external load over the full recharge time. Calculated as Energy Available [3] / Time Taken [4]

CoP & Available Power vs Variables (to meet a specific %Ah discharge)

No	Capacity (Ah)	Coil V	HV (kV)	V_{pk}	PRF (Hz)	%Duty	Start Ah (%)	%Ah	Charge time	CoP	Time to replace E [1]	Load I (A) [2]	Ext. Load (A)	Ext. Power [3]	Comments
1	7	13.0	1.04	13.53	100	65	100	20	15	1.62	56	1.49	0.59	7.4	1 x $LiFePO_4$ - PRF Test
2	7	13.0	1.04	13.32	108	65	100	20	15	5.56	16	5.13	4.23	52.9	1 x $LiFePO_4$ - PRF Test
3	7	13.0	1.04	13.33	116	65	100	20	15	5.12	18	4.58	3.70	46.3	1 x $LiFePO_4$ - PRF Test
4	7	12.5	1.04	13.32	108	65	100	20	15	6.59	17	5.04	4.26	53.2	1 x $LiFePO_4$ - Coil V Test
5	7	12.0	1.04	13.33	108	65	100	20	15	6.64	21	4.07	3.41	42.7	1 x $LiFePO_4$ - Coil V Test
6	7	12.3	1.04	13.32	108	65	100	20	15	6.51	18	4.58	3.85	48.1	1 x $LiFePO_4$ - Coil V Test
7	7	12.7	1.04	13.33	108	65	100	20	15	5.54	18	4.58	3.75	46.9	1 x $LiFePO_4$ - Coil V Test
8	7	12.5	1.04	13.21	108	65	80	10	15	3.06	17	2.45	1.65	20.6	1 x $LiFePO_4$ - Discharge Test
9	7	12.5	1.04	13.24	108	65	90	20	15	5.82	19	4.48	3.71	46.4	1 x $LiFePO_4$ - Discharge Test
10	7	12.5	1.04	13.26	108	65	90	30	20	2.42	65	1.94	1.14	14.2	1 x $LiFePO_4$ - Discharge Test
11	7	12.5	1.04	13.25	108	65	90	15	15	9.94	8	7.70	6.92	86.5	1 x $LiFePO_4$ - Discharge Test
12	7	12.5	1.04	13.22	108	65	80	10	15	3.04	18	2.40	1.61	20.1	1 x $LiFePO_4$ - Discharge Test
13	7	12.5	1.04	13.23	108	65	80	15	15	2.64	30	2.10	1.30	16.3	1 x $LiFePO_4$ - Discharge Test
14	7	12.5	1.04	13.32	108	65	100	15	12	5.88	14	4.50	3.73	46.6	1 x $LiFePO_4$ - Discharge Test
15	7	12.5	1.04	13.25	108	65	90	15	10	13.40	6	9.90	9.15	114.4	1 x $LiFePO_4$ - Discharge Test
16	7	12.5	1.04	13.26	108	65	95	20	15	13.54	8	10.50	9.72	121.5	1 x $LiFePO_4$ - Discharge Test
17	7	26.0	1.04	26.76	108	65	100	20	15	1.77	26	3.22	1.41	17.7	2 x $LiFePO_4$ - PRF Test
18	7	26.0	1.04	26.62	108	65	100	20	15	3.06	15	5.60	3.77	47.1	2 x $LiFePO_4$ - PRF Test
19	18	12.5	1.04	13.40	180	65	100	10	10	3.42	35	3.09	2.33	29.1	Li - PRF Test - (Fixed V_{pk})
20	18	12.5	1.04	13.40	140	65	100	10	10	8.75	35	3.09	2.37	29.6	Li - PRF Test - (Fixed V_{pk})
21	18	12.5	1.04	13.40	120	65	100	10	10	3.67	38	2.88	2.18	27.3	Li - PRF Test - (Fixed V_{pk})
22	18	12.5	1.04	13.40	150	65	100	10	10	9.56	30	3.60	2.90	36.3	Li - PRF Test - (Fixed V_{pk})
23	18	12.5	1.04	13.40	150	65	100	10	10	2.79	30	3.60	2.90	36.3	Li - PRF Test - (Fixed V_{pk})
24	18	12.5	1.04	13.40	220	65	100	10	10	6.84	30	3.60	2.82	35.3	Li - PRF Test - (Fixed V_{pk})
25	18	12.5	1.04	13.40	150	65	100	20	15	8.53	36	5.93	5.23	65.4	Li - PRF Test - (Fixed V_{pk})
26	18	12.5	1.04	13.40	110	65	100	20	15	6.90	40	5.40	4.62	57.8	Li - PRF Test - (Fixed V_{pk})
27	18	12.5	1.04	13.40	160	65	100	20	15	8.40	36	5.93	5.23	65.4	Li - PRF Test - (Fixed V_{pk})
28	18	12.5	1.04	13.40	170	65	100	20	15	7.05	40	5.40	4.64	58.0	Li - PRF Test - (Fixed V_{pk})
29	18	12.5	1.04	13.40	155	65	100	20	15	8.45	36	5.93	5.24	65.5	Li - PRF Test - (Fixed V_{pk})
30	18	12.5	1.04	13.40	145	65	100	20	15	7.75	36	5.93	5.17	64.6	Li - PRF Test - (Fixed V_{pk})
31	18	13.0	1.04	13.40	155	65	100	20	15	7.44	36	5.93	5.17	64.6	Li - Coil V Test - (Fixed V_{pk})
32	18	12.0	1.04	13.40	155	65	100	20	15	11.28	36	5.93	5.39	67.4	Li - Coil V Test - (Fixed V_{pk})
33	18	11.5	1.04	13.40	155	65	100	20	15	14.43	36	5.93	5.47	68.4	Li - Coil V Test - (Fixed V_{pk})
34	18	12.0	1.04	13.26	155	65	90	10	15	27.24	6	16.80	16.14	201.8	Li - % Discharge Test
35	18	12.0	1.04	13.23	155	65	90	10	15	28.81	6	18.00	17.35	216.9	Li - % Discharge Test
36	18	12.0	1.04	13.26	155	65	90	20	15	24.20	18	11.78	11.09	138.6	Li - % Discharge Test
37	18	12.0	1.04	13.24	155	65	80	20	15	10.38	31	6.92	6.24	78.0	Li - % Discharge Test
38	18	12.0	1.04	13.25	155	65	80	15	12	27.00	9	18.00	17.32	216.5	Li - % Discharge Test
39	7	12.5	1.10	13.23	108	65	100	10	10	10.65	6	7.20	6.51	81.4	Li - HV Test
40	18	12.0	1.10	13.25	155	65	85	10	6	44.47	4	25.20	24.60	307.5	Li - HV Test
41	17	13.0	1.10	13.26	180	65	100	40	10	8.17	53	7.75	6.88	86.0	SLA - HV Test
42	7	12.5	1.10	12.49	108	65	100	20	10	4.20	24	3.50	2.72	34.0	SLA - HV Test
43	7	12.5	1.10	13.25	108	65	100	20	10	13.26	9	9.33	8.62	107.8	Li - HV Test
44	18	12.0	1.10	13.26	155	65	85	10	5	34.84	5	21.60	20.97	262.1	Li - HV Test
45	18	12.0	1.10	13.25	155	65	85	10	6	53.12	3	32.40	31.76	397.0	Li - HV Test
46	18	12.5	1.10	13.25	155	65	85	10	5	26.28	6	19.44	18.69	233.6	Li - Coil V Test
47	7	12.5	1.53	12.84	108	65	100	20	15	2.18	64	1.32	0.55	6.8	SLA - HV Test
48	18	12.0	1.53	13.25	155	65	85	10	5	53.94	3	32.40	31.80	397.5	Li - HV Test
49	17	13.0	1.53	13.19	180	65	100	40	10	8.97	49	8.37	7.50	93.7	SLA - HV Test
50	7	12.5	1.53	13.26	108	65	100	20	10	14.47	8	10.27	9.56	119.5	Li - HV Test
51	18	12.0	1.70	13.24	155	65	85	10	5	53.21	4	30.00	29.40	367.5	Li - HV Test
52	17	13.0	1.70	13.33	180	65	100	40	10	7.57	58	7.03	6.18	77.3	SLA - HV Test
53	7	12.5	1.70	13.23	108	65	95	20	10	14.39	6	13.20	12.52	156.5	Li - HV Test
54	7	12.5	1.70	12.82	108	65	100	20	15	2.16	52	1.62	0.90	11.2	SLA - HV Test
55	7	12.5	1.70	13.25	108	65	95	20	10	13.48	8	10.50	9.73	121.6	Li - HV Test
56	7	12.5	1.70	13.25	108	65	95	20	10	13.50	8	10.50	9.73	121.6	Li - HV Test (No rotor)
57	7	12.5	1.70	13.25	108	65	95	20	10	19.52	7	11.55	10.95	136.9	Li - HV Test
58	18	12.0	1.70	13.23	155	65	85	10	5	60.88	3	30.00	29.49	368.6	Li - HV Test
59	7	12.5	1.70	13.25	108	65	95	20	10	17.14	8	10.50	9.88	123.5	Li - HV Test (No rotor)
60	18	12.0	1.70	13.24	155	65	85	10	6	52.50	4	28.29	27.72	346.5	Li - HV Test (No rotor)
61	18	12.0	0.50	13.23	155	65	85	10	5	54.66	4	30.00	29.45	368.1	Li - HV Test
62	18	11.0	0.50	13.23	155	65	85	10	5	88.44	4	30.00	29.61	370.1	Li - HV Test
63	7	12.5	0.50	12.79	108	65	100	20	10	2.95	44	1.91	1.29	16.1	SLA - HV Test

Notes: [1] Extrapolated time to fully replace the energy discharged

Notes: [2] Total load, including circuit current, to achieve discharge %Ah in full recharge time (I = Discharge Ah x t)

Notes: [3] External power available that results in the required %Ah discharge in the time taken to fully replace the energy discharged

Notes: The difference between this table and the Summary table is that the available external power value is 'limited' by the desired %Ah discharge level. If the power drawn was equal to the available energy/time to reach full charge then the current drawn would bring the %Ah discharge down further than desired. However, in practice that may or may not lower the effective available power.

External Power Errors

	Energy Available (E)	Δ_E	δ_E	T	Δ_T	δ_T	$P_{(available)}$	δ_P	Δ_P	Comments
1	24.40	0.1	4.10E-03	56.25	0.1	1.78E-03	7.4	5.88E-03	4.36E-02	
2	52.47	0.1	1.91E-03	16.36	0.1	6.11E-03	52.9	8.02E-03	4.24E-01	
3	51.51	0.1	1.94E-03	18.33	0.1	5.45E-03	46.3	7.40E-03	3.42E-01	
4	54.27	0.1	1.84E-03	16.67	0.1	6.00E-03	53.2	7.84E-03	4.18E-01	
5	54.17	0.1	1.85E-03	20.63	0.1	4.85E-03	42.7	6.69E-03	2.86E-01	
6	54.04	0.1	1.85E-03	18.33	0.1	5.45E-03	48.1	7.30E-03	3.52E-01	
7	52.17	0.1	1.92E-03	18.33	0.1	5.45E-03	46.9	7.37E-03	3.46E-01	
8										
9										

Table 7

Run Battery - Current supply

Test No.	57	58	59	60	61	62	63
Interval	1m	1m	1m	1m	1m	1m	1m
Data Point	I (A)	I (A)	I (A)	I (A)	I (A)	I (A)	I (A)
1	0.5923	0.5407	0.6255	0.5287	0.5560	0.3917	0.6284
2	0.6037	0.5130	0.6246	0.5260	0.5543	0.3911	0.6571
3	0.5981	0.5100	0.6246	0.5282	0.5553	0.3903	0.6505
4	0.5928	0.5093	0.6238	0.5277	0.5550	0.3899	0.6486
5	0.5924	0.5084	0.6231	0.5271	0.5525	0.3890	0.6431
6	0.6076	0.5075	0.6174	0.5243	0.5473	0.3888	0.6411
7	0.6059		0.6168				0.6396
8	0.5897		0.6167				0.6351
9	0.6135		0.6161				0.6336
10	0.6127		0.6089				0.5645
11							0.5856
12							0.5782
13							0.5976
14							0.5954
15							0.5916
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							
Mean:	0.60	0.51	0.62	0.53	0.55	0.39	0.62
SD:	0.01	0.01	0.01	0.00	0.00	0.00	0.03
Min	0.5891	0.5075	0.6089	0.5243	0.5473	0.3888	0.5645
Max	0.6135	0.5407	0.6255	0.5287	0.5560	0.3917	0.6571
Range	0.02	0.03	0.02	0.00	0.01	0.00	0.09
Δ	0.01	0.02	0.01	0.00	0.00	0.00	0.05
δ	0.02	0.03	0.01	0.01	0.01	0.00	0.07

Notes: $\delta_I = \Delta_I / \mu$ (Uncertainty / Average) = (0.5 x Value range / Mean value)