

# Liberty<sup>®</sup> AES

## THE LIBERTY AES CYCLE SERIES BATTERY

### For Renewable Energy Storage Applications

#### CAPACITIES UP TO 1834 AMPERE-HOURS

The Liberty<sup>®</sup> AES features the proven DCS technology for maximum cycle life in a space efficient, cost effective package. The DCS technology coupled with an advanced C&D Nano-Carbon<sup>®</sup> enhanced negative electrode provides time proven results and unmatched, industry leading cycle life, even in partial state of charge (PSoC) operation.

#### APPLICATIONS

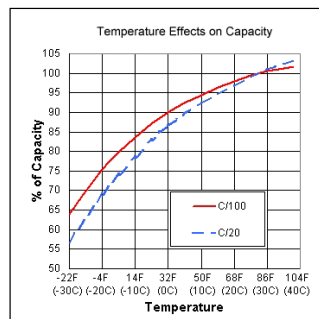
- Remote/Hybrid Sites
- Communications
- Off-Grid/Renewable
- Grid scale energy storage
- Other cycling applications



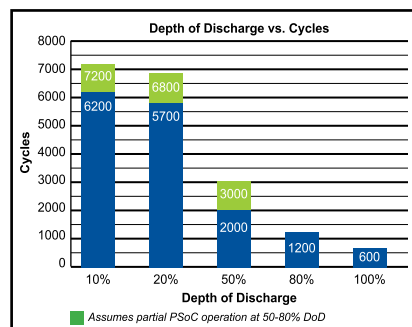
#### FEATURES AND BENEFITS

- 95% round trip efficiency
- 99.9% charge efficiency
- 20 year design life
- High density pasted plates for high cycle life
- Every cell capacity tested to ensure performance
- C&D Nano-Carbon<sup>®</sup> enhanced active material to maximize cycle performance and PSoC operation
- Low calcium Lead/Tin alloy plates for efficient gas recombination for long life in both cycling and float applications
- Absorbent Glass Mat (AGM) technology for efficient gas recombination of up to 99% and freedom from electrolyte maintenance
- Threaded copper alloy inserts for reduced maintenance and increased safety
- Reduced system hardware for rapid installation
- Terminal versatility - ease of diagnostic readings with C&D Ohmic Ring<sup>®</sup>
- Meets IBC and UBC seismic requirements
- High-strength, leak-free polymer container allows for non-restricted shipping: Water: non-hazardous per IMDG Amendment 27 Surface: non-hazardous per DOT-CFR title 49, 171-189 Air: IATA/ICAO, provision A67
- 100% helium leak tested and dielectric tested to ensure seal integrity
- UL-recognized component
- Flame retardant UL94V0/28% LOI is optional.

#### BATTERY CHARACTERISTICS

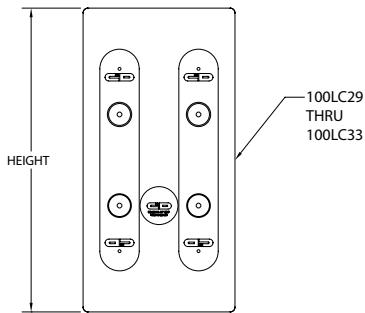
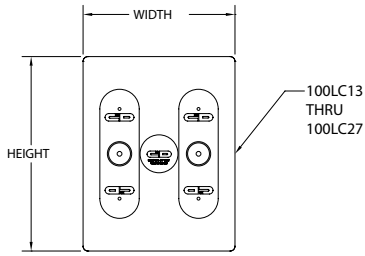


#### INDUSTRY LEADING CYCLE LIFE

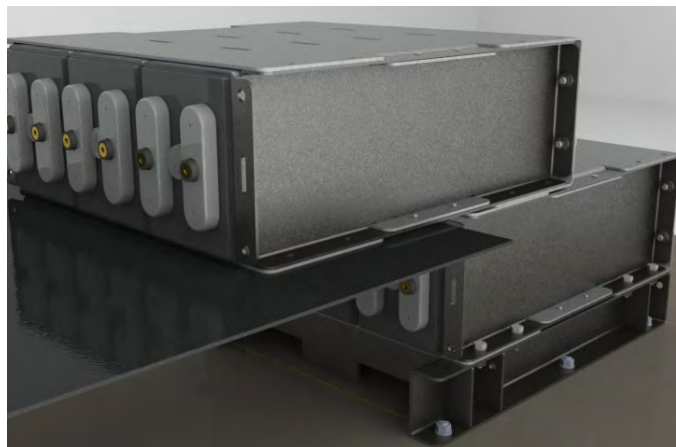
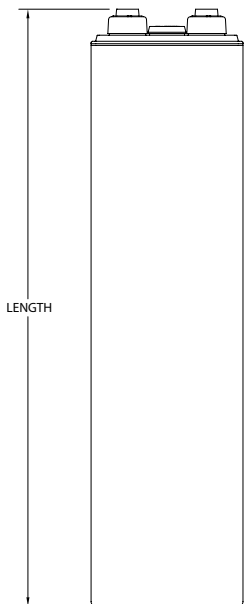


# CELL SPECIFICATIONS

<b>Voltage</b>	2 VDC Nominal per cell
<b>Energy saving operating temperature</b>	77°F (25°C)
<b>Connection Torque</b>	110 in-lbs (12.4 N-m)
<b>Recommended float charging voltage</b>	2.25 - 2.27 Volts per cell average @ 77°F (25°C)
<b>Recommended cycle service voltage</b>	2.35 - 2.40 Volts per cell average @ 77°F (25°C)
<b>Charger compensation temperature/voltage</b>	- 2 mV/cell/°F above 77°F (-3.6 mV/cell°C above 25°C) + 2 mV/cell/°F below 77°F (+3.6 mV/cell°C above 25°C)



Individual Cell Dimensions (not including module)								
Liberty AES Model	Height		Width		Length		Weight	
	inches	mm	inches	mm	inches	mm	lbs	kg
100LC13	5.00	127.0	6.25	158.8	24.55	623.6	75.0	34.0
100LC17	6.50	165.1					109.0	49.4
100LC19	7.25	184.2					120.0	54.4
100LC21	8.00	203.2					132.0	59.9
100LC23	8.75	222.3					146.0	66.2
100LC25	9.50	241.3					157.0	71.2
100LC27	10.25	260.4					168.0	76.2
100LC29	11.00	279.4					183.0	83.0
100LC31	11.75	298.5					195.0	88.5
100LC33	12.50	317.5					209.0	94.8



Rapid System Assembly

# PERFORMANCE SPECIFICATIONS

Amperes to 1.75 Final Volts Per Cell @ 77°F (25°C)															
	1 hr	2 hr	4 hr	5 hr	6 hr	8 hr	10 hr	12 hr	20 hr	24 hr	36 hr	48 hr	72 hr	100 hr	120 hr
100LC13	293.4	203.7	126.4	107.2	93.3	74.5	62.2	53.4	34.4	29.2	20.1	15.6	10.8	8.0	6.7
100LC17	391.1	271.5	168.6	142.9	124.4	99.3	82.9	71.2	45.9	38.6	26.8	20.8	14.4	10.6	9.0
100LC19	440.0	305.5	189.6	160.8	139.9	111.7	93.2	80.1	51.6	43.5	30.2	23.4	16.2	12.0	10.1
100LC21	488.9	339.4	210.7	178.6	155.5	124.1	103.6	89.1	57.3	48.3	33.5	26.0	18.0	13.3	11.2
100LC23	537.8	373.4	231.8	196.5	171.0	136.5	114.0	98.0	63.1	53.1	36.9	28.6	19.8	14.6	12.3
100LC25	586.7	407.3	252.9	214.3	186.6	148.9	124.3	106.9	68.8	58.0	40.2	31.2	21.6	16.0	13.4
100LC27	635.6	441.2	273.9	232.2	202.1	161.3	134.7	115.8	74.5	62.8	43.6	33.8	23.4	17.3	14.6
100LC29	684.5	475.2	295.0	250.1	217.7	173.7	145.0	124.7	80.3	67.6	46.9	36.4	25.2	18.6	15.7
100LC31	733.4	509.1	316.1	267.9	233.2	186.2	155.4	133.6	86.0	72.5	50.3	39.0	27.0	19.9	16.8
100LC33	782.3	543.1	337.2	285.8	248.8	198.6	165.8	142.5	91.7	77.3	53.6	41.6	28.8	21.3	17.9

Amperes to 1.80 Final Volts Per Cell @ 68°F (20°C)															
	1 hr	2 hr	4 hr	5 hr	6 hr	8 hr	10 hr	12 hr	20 hr	24 hr	36 hr	48 hr	72 hr	100 hr	120 hr
100LC13	269.4	190.1	122.2	104.4	91.2	73.1	61.2	52.6	33.9	28.8	19.9	15.5	10.7	7.9	6.7
100LC17	340.2	240.0	154.3	131.8	115.2	92.3	81.5	70.1	42.7	36.2	25.1	19.5	13.6	10.0	8.4
100LC19	382.7	270.0	173.6	148.3	129.6	103.9	91.7	78.9	48.1	40.8	28.2	22.0	15.3	11.3	9.5
100LC21	425.2	300.0	192.9	164.7	144.0	115.4	101.9	87.7	53.4	45.3	31.4	24.4	17.0	12.5	10.5
100LC23	467.8	330.0	212.2	181.2	158.4	127.0	112.1	96.4	58.8	49.8	34.5	26.8	18.7	13.8	11.6
100LC25	510.3	360.0	231.5	197.7	172.8	138.5	122.3	105.2	64.1	54.4	37.6	29.3	20.4	15.0	12.6
100LC27	552.8	390.0	250.8	214.2	187.2	150.1	132.5	114.0	69.5	58.9	40.8	31.7	22.0	16.3	13.7
100LC29	595.3	420.0	270.1	230.6	201.6	161.6	142.7	122.7	74.8	63.4	43.9	34.2	23.7	17.5	14.7
100LC31	637.8	450.0	289.4	247.1	216.0	173.2	152.9	131.5	80.1	67.9	47.1	36.6	25.4	18.8	15.8
100LC33	680.4	480.0	308.7	263.6	230.4	184.7	163.1	140.3	85.5	72.5	50.2	39.0	27.1	20.0	16.8

You may also access the product ratings by logging onto the C&D Battery Sizing program at [www.cdstandbypower.net](http://www.cdstandbypower.net)

## MODULE CONFIGURATIONS

Module Type	Nominal Volts	Nominal AH Capacity (20 HR)	STACKING DIMENSIONS						UNPACKED WEIGHT	
			WIDTH		HEIGHT		DEPTH		lbs	kgs
			in	mm	in	mm	in	mm		
100LC13	6	688	21.73	552	5.38	137	26.38	670	322	146
100LC13	8	688	28.01	711	5.38	137	26.38	670	421	191
100LC17	6	918	21.91	557	6.88	175	26.38	670	405	184
100LC17	8	918	28.25	718	6.88	175	26.38	670	533	242
100LC19	6	1032	21.91	557	7.63	194	26.38	670	441	200
100LC19	8	1032	28.25	718	7.63	194	26.38	670	581	264
100LC21	6	1146	21.91	557	8.38	213	26.38	670	477	216
100LC21	8	1146	28.25	718	8.38	213	26.38	670	628	285
100LC23	6	1262	21.91	557	9.13	232	26.38	670	523	237
100LC23	8	1262	28.25	718	9.13	232	26.38	670	688	312
100LC25	6	1376	21.91	557	9.88	232	26.38	670	556	252
100LC25	8	1376	28.25	718	9.88	251	26.38	670	731	332
100LC27	6	1490	21.91	557	10.63	270	26.38	670	592	269
100LC27	8	1490	28.25	718	10.63	270	26.38	670	779	353
100LC29	6	1606	21.91	557	11.38	289	26.38	670	640	290
100LC29	8	1606	28.25	718	11.38	289	26.38	670	842	382
100LC31	6	1720	21.91	557	12.13	308	26.38	670	676	307
100LC31	8	1720	28.25	718	12.13	308	26.38	670	890	404
100LC33	6	1834	21.91	557	12.88	327	26.38	670	721	327
100LC33	8	1834	28.25	718	12.88	327	26.38	670	949	430

You may also access the complete product binder by logging onto the C&D Battery Sizing Program at [www.cdstandbypower.net](http://www.cdstandbypower.net)

# SYSTEM CONFIGURATIONS

Cell Per Module	Model Number	System Voltage	Stacks	System Configuration	Total Modules	Nominal Capacity*	Width		Depth		Height		Weight	
							in.	mm	in.	mm	in.	mm	lbs	kgs
3	100LC17	24	1	3 x 4	4	918	21.91	557	26.38	670	32.02	813	1661	753
		48	1	3 x 8	8	918	21.91	718	26.38	670	59.54	1512	3269	1483
4	100LC17	24	1	4 x 3	3	918	28.25	557	26.38	670	25.14	639	1639	743
		48	1	4 x 6	6	918	28.25	718	26.38	670	45.78	1163	3220	1461
3	100LC19	24	1	3 x 4	4	1032	21.91	557	26.38	670	35.02	890	1813	822
		48	1	3 x 8	8	1032	21.91	718	26.38	670	65.54	1665	3573	1621
4	100LC19	24	1	4 x 3	3	1032	28.25	557	26.38	670	27.39	696	1789	811
		48	1	4 x 6	6	1032	28.25	718	26.38	670	50.28	1277	3520	1597
3	100LC21	24	1	3 x 4	4	1146	21.91	557	26.38	670	38.02	966	1953	886
		48	1	3 x 8	8	1146	21.91	718	26.38	670	71.54	1817	3853	1748
4	100LC21	24	1	4 x 3	3	1146	28.25	557	26.38	670	29.64	753	1927	874
		48	1	4 x 6	6	1146	28.25	718	26.38	670	54.78	1391	3795	1721
3	100LC23	24	1	3 x 4	4	1262	21.91	557	26.38	670	41.02	1042	2141	971
		48	1	3 x 8	8	1262	21.91	718	26.38	670	77.54	1970	4229	1918
4	100LC23	24	1	4 x 3	3	1262	28.25	557	26.38	670	31.89	810	2113	958
		48	1	4 x 6	6	1262	28.25	718	26.38	670	59.28	1506	4165	1889
3	100LC25	24	1	3 x 4	4	1376	21.91	557	26.38	670	44.02	1118	2269	1029
4	100LC25	24	1	4 x 3	3	1376	28.25	557	26.38	670	34.14	867	2239	1016
		48	1	4 x 6	6	1376	28.25	718	26.38	670	63.78	1620	4420	2005
3	100LC27	24	1	3 x 4	4	1490	21.91	557	26.38	670	47.02	1194	2409	1093
4	100LC27	24	1	4 x 3	3	1490	28.25	557	26.38	670	36.39	924	2377	1078
		48	1	4 x 6	6	1490	28.25	718	26.38	670	68.28	1734	4695	2130
3	100LC29	24	1	3 x 4	4	1606	21.91	557	26.38	670	50.02	1271	2609	1183
4	100LC29	24	1	4 x 3	3	1606	28.25	557	26.38	670	38.64	981	2575	1168
		48	1	4 x 6	6	1606	28.25	718	26.38	670	72.78	1849	5090	2309
3	100LC31	24	1	3 x 4	4	1720	21.91	557	26.38	670	53.02	1347	2749	1247
4	100LC31	24	1	4 x 3	3	1720	28.25	557	26.38	670	40.89	1039	2713	1231
		48	1	4 x 6	6	1720	28.25	718	26.38	670	77.28	1963	5365	2434
3	100LC33	24	1	3 x 4	4	1834	21.91	557	26.38	670	56.02	1423	2937	1332
4	100LC33	24	1	4 x 3	3	1834	28.25	557	26.38	670	43.14	1096	2899	1315
		48	1	4 x 6	6	1834	28.25	718	26.38	670	81.78	2077	5740	2604

\* 20 hour rate to 1.75 VPC @ 77°F (25°C) - Ampere hours.

## Terminal Plates (standard)



For 100LC13 through 100LC27  
(Cover removed for clarity)



For 100LC29 through 100LC33  
(Cover removed for clarity)

## Side Termination (optional)



For 100LC17 through 100LC33  
(Cover removed for clarity)

## C&D TECHNOLOGIES, INC.

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