



UL Recognized Component



# LIBERTY® SERIES 1000

## VALVE REGULATED LEAD-CALCIUM BATTERY FOR STANDBY APPLICATIONS

Capacities from 100 to 600 Ampere-hours (8 hours to 1.75 VPC)  
343 to 2060 Watts per cell (15 mins to 1.67 VPC)

C&D Technologies valve regulated lead-acid (VRLA) batteries are engineered to provide performance reliability and consistency over the life of the product. Designed using C&D's patented processes, these



products offer long battery life with minimal maintenance. The versatile Liberty® Series 1000 10-year VRLA product fits virtually anywhere and provides superior performance in the most demanding applications.

## APPLICATIONS

### Telecom

- Customer Premise
- Broadband
- Wireless
- PBX
- Repeaters
- Fixed Wireline
- Outside Plants
- Underground Battery Vaults

### Switchgear Utility

- Electric Utility
- Railway Signals
- Emergency Systems
- Manufacturing Facilities
  - Assembly Lines
  - Process Controls
- Petrochemical processing plants
- Pipelines

### UPS

- Data Centers
- Network Operations Centers
- Industrial Process Control Facilities
- Semiconductor Manufacturing
- Banks & Financial Markets
- Power Generation Plants
- Hospital & Testing Laboratories
- Emergency 911 response centers

## SPECIFICATIONS

<b>Electrolyte at 77°F (25°C)</b>	1.300 specific gravity nominal sulfuric acid
<b>System float voltages</b>	2.25–2.27 volts per cell
<b>Life expectancy</b>	10 years, full float service at 77°F (25°C)
<b>Container and cover</b>	High-impact, flame-retardant PVC Flammability ratings: UL 94-V0; ASTM D-635, self-extinguishing Oxygen index > 32
<b>Safety vent system</b>	Low-pressure release valve with flash arrester

**Note:** AC ripple current from the charger shall not exceed 5 percent of the 8 hour (ampere-hour) rating of the battery.

## FEATURES & BENEFITS

- Advanced, computer-controlled thermal cover-to-jar weld for greater reliability and consistency
- Automated, state-of-the-art, cast-on strap process ensures consistent, high-quality, low electrical-resistance welds
- Through-the-partition intercell connection shortens current paths and increases performance
- Copper-to-copper connections minimize resistance, especially at high rates, and shorten maintenance time by reducing the need for retorquing connections
- Patented and time-tested C&D post seal design with secondary epoxy seal to increase integrity
  - Leak-free operation
  - Superior reliability
- Two-fold vent system, comprised of a low-pressure safety valve with flash arrester, minimizes bulging and prevents flashback explosion from external ignition source
- Thick radial grid design for both positive and negative plates improves current carrying capacity and performance resulting in long float life
- Fully automated vacuum and filling operation results in uniform acid volume distribution and consistent float voltage
- Immobilized electrolyte technology using an absorbent glass mat design (AGM) offers safe handling and storage
- Non-spillable designation for lower shipping cost
- High-impact resistant PVC container and cover provide excellent water vapor retention, preventing dry out and oxygen infiltration

## MEASURABLE QUALITY AND OUTSTANDING PERFORMANCE

- 100 percent of cells tested for conductance, voltage and capacity
- Tested in accordance with Bellcore TR-NWT-000766 specifications
- 100 percent of cells tested to 95 percent capacity at the 8 hour rate to 1.75 VPC

## SPECIFICATION

	LS 12-100	LS 6-200	LS 4-300	LS 2-600*
<b>Nominal voltage</b>	12 volts	6 volts	4 volts	2 volts
<b>Number of cells</b>	6 / unit	3 / unit	2 / unit	1 / unit
<b>Rated 8-hr to capacity (ampere-hours to 1.75 VPC)</b>	100 Ah to 10.5 volts	200 Ah to 5.25 volts	300 Ah to 3.5 volts	600 Ah to 1.75 volts
<b>Rated 15-min capacity (watts per cell to 1.67 VPC)</b>	344	688	1030	2060
<b>Internal resistance per cell</b>	0.000786 Ohms	0.000393 Ohms	0.000262 Ohms	0.000131 Ohms
<b>Short circuit current</b>	2545 A	5089 A	7634 A	15267 A
<b>Unit height</b>	8.95 in (227 mm)	8.95 in (227 mm)	8.95 in (227 mm)	8.95 in (227 mm)
<b>Unit length (includes handles)</b>	16.58 in (421 mm)	16.58 in (421 mm)	16.58 in (421 mm)	16.58 in (421 mm)
<b>Unit width</b>	6.84 in (174 mm)	6.84 in (174 mm)	6.84 in (174 mm)	6.84 in (174 mm)
<b>Weight</b>	95 lbs (43 kg)	95 lbs (43 kg)	95 lbs (43 kg)	95 lbs (43 kg)
<b>Plate thickness positive</b>	0.140 in (3.56 mm)			
<b>negative</b>				
<b>Terminal characteristics</b>	0.625 in diameter, threaded copper insert, 0.75 in deep. Fasten with 1/4-20 stainless steel hex bolt /washer.			

\* 2 cells connected in parallel for 2-volt units

## RATINGS IN AMPERES AT 77°F (25°C)

Final volts per cell	Reserve Time														
	Models	1 min	5 min	10 min	15 min	30 min	1 hr	2 hr	3 hr	4 hr	5 hr	6 hr	8 hr	10 hr	20 hr
1.95	LS12-100	123.2	115.1	104.8	94.6	70.0	45.7	28.1	20.7	16.3	13.5	11.6	9.1	7.5	4.1
	LS6-200	246.5	230.2	209.5	189.3	140.1	91.4	56.3	41.3	32.7	27.0	23.1	18.1	15.0	8.3
	LS4-300	372.6	348.5	317.8	287.6	213.4	139.1	85.5	62.0	49.0	40.5	34.7	27.2	22.5	12.4
	LS2-600	739.4	690.6	628.6	567.8	420.2	274.2	168.8	124.0	98.0	81.0	69.3	54.3	45.0	24.8
1.90	LS12-100	187.5	169.4	147.0	126.8	87.4	55.5	33.4	24.2	19.0	15.8	13.5	10.5	8.6	4.7
	LS6-200	374.9	338.8	293.9	253.6	174.9	110.9	66.7	47.2	38.1	31.6	27.0	21.0	17.2	9.3
	LS4-300	562.4	508.2	440.9	380.4	262.3	166.4	100.1	72.6	57.1	47.4	40.5	31.5	25.9	14.0
	LS2-600	1124.7	1016.4	881.8	760.9	524.6	332.7	200.2	145.1	114.3	94.8	81.0	62.9	51.7	27.9
1.88	LS12-100	216.1	191.0	161.5	137.0	93.0	58.1	34.8	25.2	19.9	16.5	14.2	11.0	9.1	4.8
	LS6-200	431.9	382.3	323.2	273.9	185.7	113.5	69.7	50.4	39.8	33.0	28.3	22.1	18.1	9.7
	LS4-300	616.2	548.5	467.9	399.6	273.0	171.3	102.5	74.3	58.9	49.0	42.1	32.9	27.1	14.4
	LS2-600	1295.2	1148.3	970.7	820.2	562.0	350.9	208.0	151.1	119.5	99.1	84.7	65.8	53.9	28.3
1.85	LS12-100	258.6	224.2	183.5	151.9	101.5	62.4	37.1	26.9	21.2	17.5	15.0	11.6	9.5	5.0
	LS6-200	517.1	448.4	367.0	303.8	203.0	124.8	74.2	53.8	42.4	35.1	30.0	23.2	19.0	9.9
	LS4-300	775.7	672.6	550.5	455.8	304.5	187.3	111.3	80.7	63.6	52.6	44.9	34.8	28.4	14.9
	LS2-600	1551.4	1345.3	1100.9	911.5	609.0	374.5	222.6	161.4	127.2	105.3	89.9	69.6	56.9	29.7
1.84	LS12-100	272.7	233.9	189.3	155.8	103.2	63.3	37.6	27.3	21.6	17.9	15.3	11.9	9.7	5.1
	LS6-200	545.4	467.9	378.6	311.7	206.5	126.6	75.1	54.6	43.2	35.8	30.6	23.8	19.5	10.2
	LS4-300	818.2	701.8	567.9	467.5	309.7	189.8	112.9	81.8	64.4	53.3	45.5	35.2	28.7	15.0
	LS2-600	1636.4	1403.6	1135.8	935.0	619.4	379.6	225.8	163.6	128.9	106.6	90.9	70.4	57.4	30.0
1.80	LS12-100	329.4	272.4	213.0	171.7	110.1	67.0	39.7	28.7	22.5	18.6	15.8	12.2	10.0	5.2
	LS6-200	658.8	544.9	426.0	343.5	220.1	134.1	79.4	57.4	45.1	37.2	31.7	24.5	20.0	10.4
	LS4-300	988.2	817.3	639.0	515.2	330.2	201.1	119.2	86.0	67.6	55.8	47.5	36.7	29.9	15.6
	LS2-600	1976.5	1634.7	1278.0	1030.4	660.3	402.2	238.3	172.1	135.3	111.6	95.1	73.5	59.9	31.2
1.78	LS12-100	358.4	284.2	218.2	175.3	112.0	68.0	40.2	29.1	22.8	18.8	16.1	12.4	10.1	5.3
	LS6-200	716.5	569.3	435.1	350.1	224.5	135.5	80.5	58.2	45.7	37.7	32.1	24.8	20.2	10.5
	LS4-300	1075.1	852.5	654.5	525.9	336.1	204.0	120.7	87.2	68.5	56.5	48.2	37.2	30.3	15.8
	LS2-600	2149.6	1708.0	1305.3	1050.4	673.4	406.6	241.6	174.6	137.2	113.2	96.4	74.4	60.6	31.5
1.75	LS12-100	401.7	302.2	225.4	180.3	115.1	69.4	41.0	29.6	23.3	19.2	16.4	12.6	10.3	5.4
	LS6-200	803.5	604.4	450.7	360.6	230.1	138.8	82.1	59.3	46.6	38.4	32.7	25.0	20.6	10.7
	LS4-300	1205.2	906.5	676.1	540.9	345.2	208.2	123.1	88.9	69.9	57.7	49.1	37.5	30.9	16.1
	LS2-600	2410.4	1813.1	1352.2	1081.9	690.4	416.4	246.3	177.8	139.7	115.3	98.2	75.0	61.9	32.2

Note: Liberty Series 1000 batteries are tested to 95 percent of published rates at time of shipment at 8 hour rate to 1.75 VPC. Additional ratings and application information is available in the Battery Selection Program at [www.cdstandbypower.net](http://www.cdstandbypower.net)

## RATINGS IN KW PER CELL AT 77°F (25°C)

Final volts per cell	Reserve Time										
	Models	1 min	5 min	10 min	15 min	20 min	30 min	1 hr	3 hr	5 hr	8 hr
1.95	LS12-100	0.240	0.225	0.207	0.188	0.170	0.139	0.091	0.041	0.028	0.018
	LS6-200	0.480	0.451	0.413	0.375	0.339	0.279	0.181	0.083	0.055	0.037
	LS4-300	0.720	0.676	0.620	0.563	0.509	0.418	0.272	0.124	0.083	0.055
	LS2-600	1.440	1.353	1.239	1.126	1.017	0.836	0.544	0.248	0.165	0.111
1.90	LS12-100	0.357	0.324	0.284	0.247	0.216	0.172	0.109	0.048	0.032	0.021
	LS6-200	0.713	0.649	0.568	0.493	0.431	0.343	0.219	0.096	0.063	0.042
	LS4-300	1.070	0.973	0.851	0.740	0.647	0.515	0.328	0.144	0.095	0.063
	LS2-600	2.139	1.946	1.703	1.480	1.294	1.030	0.657	0.289	0.189	0.126
1.85	LS12-100	0.479	0.421	0.349	0.291	0.249	0.196	0.122	0.053	0.035	0.023
	LS6-200	0.958	0.842	0.698	0.581	0.497	0.392	0.243	0.106	0.070	0.046
	LS4-300	1.436	1.263	1.047	0.872	0.746	0.588	0.365	0.159	0.105	0.070
	LS2-600	2.873	2.525	2.094	1.744	1.492	1.175	0.729	0.319	0.209	0.139
1.80	LS12-100	0.593	0.502	0.399	0.324	0.274	0.211	0.130	0.056	0.037	0.024
	LS6-200	1.186	1.005	0.799	0.649	0.548	0.422	0.260	0.113	0.073	0.048
	LS4-300	1.779	1.507	1.198	0.973	0.822	0.633	0.391	0.169	0.110	0.072
	LS2-600	3.558	3.015	2.396	1.946	1.643	1.265	0.781	0.338	0.219	0.145
1.75	LS12-100	0.703	0.547	0.416	0.337	0.284	0.219	0.134	0.058	0.038	0.025
	LS6-200	1.406	1.094	0.832	0.673	0.568	0.438	0.268	0.116	0.075	0.050
	LS4-300	2.109	1.642	1.249	1.010	0.853	0.657	0.402	0.174	0.113	0.074
	LS2-600	4.218	3.283	2.497	2.020	1.705	1.314	0.804	0.348	0.226	0.149
1.70	LS12-100	0.801	0.575	0.426	0.343	0.289	0.222	0.134	Not recommended to discharge longer than 1 hour below 1.75 VPC.		
	LS6-200	1.602	1.149	0.853	0.687	0.579	0.445	0.268			
	LS4-300	2.403	1.724	1.279	1.030	0.868	0.667	0.402			
	LS2-600	4.805	3.448	2.558	2.060	1.737	1.335	0.803			
1.67	LS12-100	0.857	0.592	0.436	0.343	Not recommended to discharge longer than 15 min. below 1.70 VPC.					
	LS6-200	1.715	1.186	0.872	0.687						
	LS4-300	2.571	1.777	1.309	1.030						
	LS2-600	5.143	3.554	2.618	2.060						
1.65	LS12-100	0.893	0.603	0.436	0.344	Not recommended to discharge longer than 15 min. below 1.70 VPC.					
	LS6-200	1.787	1.205	0.873	0.689						
	LS4-300	2.680	1.808	1.309	1.033						
	LS2-600	5.360	3.615	2.618	2.067						
1.63	LS12-100	0.929	0.612	0.437	0.345	Not recommended to discharge longer than 15 min. below 1.70 VPC.					
	LS6-200	1.859	1.223	0.874	0.691						
	LS4-300	2.788	1.836	1.310	1.036						
	LS2-600	5.576	3.671	2.620	2.072						

**Note:** Liberty Series 1000 batteries are tested to 95 percent of published rates at time of shipment at 8 hour rate to 1.75 VPC. Additional ratings and application information is available in the Battery Selection Program at [www.cdstandbypower.net](http://www.cdstandbypower.net)

## OPTIONAL ACCESSORIES

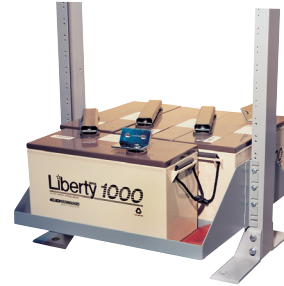
### Steel Jackets

For demanding applications, C&D provides optional components to enhance battery life. An optional steel jacket is available to preserve jar shape and maintain element compression in high-temperature operations.



### Relay Rack Battery Trays

C&D manufactures a wide range of battery trays to mount in 19 inch (48.3 cm) and 23 inch (58.4 cm) relay racks. Please see 12-1064 for more information.



## RACKS

C&D is a major supplier of high-quality VRLA battery racks to Telecommunications, Switchgear & Control, and UPS markets. Both standard and modular racks are designed and manufactured to suit all cell configurations, including multi-row and multi-tier layouts. C&D racks meet seismic loading requirements. Contact C&D Technologies for additional information.

C&D's modular racks provide a flexible, efficient method for racking Liberty Series 1000 batteries. These attractive, durable racks provide accessibility to the batteries and are easy to install. Racks are available in 29 inch (73.7 cm) and 43 inch (109.2 cm) lengths and are stackable. Optional panels are available to completely enclose racks, providing a cabinet-like appearance. Please see 12-380 for more information. Complete standby power systems from C&D include batteries, racks, and electronics.



**Modular Rack with Panels**



**Modular Rack**

## **NTEGRITY BATTERY CABINET SYSTEMS**

Complete, pre-packaged battery cabinet systems are available from C&D Technologies. Systems include battery breaker or fuse, battery cabling and batteries – all installed and ready to connect to UPS upon installation. Options for battery monitoring will also be available.

Powder-coated steel cabinets are UL1778 listed with seismic zone 4 capability available as an option. Fast acting fuses or circuit breakers are provided for system protection. Batteries are tested to assure system integrity.

Mechanical robustness, approved electrical disconnects and high quality C&D batteries all combine to provide an easily installed complete battery system with the finished appearance of a UPS cabinet.



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