

LIBERTY® SERIES 1000

VALVE REGULATED LEAD-CALCIUM BATTERY FOR STANDBY APPLICATIONS

CAPACITIES FROM 25 TO 600 AMPERE-HOURS

C&D Technologies' Standby Power Division 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.



SPECIFICATIONS

Electrolyte at 77F (25C)	1.300 specific gravity nominal sulfuric acid
System float voltages	2.25–2.27 volts per cell
Life expectancy	10 years, full float service at 77F (25C)
Container and cover	High-impact, flame-retardant thermoplastic Flammability ratings: UL 94-V0; ASTM D-635, self-extinguishing Oxygen index > 32
Safety vent system	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 AND 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 drop, especially at high rates, and shorten maintenance time by reducing the need for retorquing connections
- Patented 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 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 on most models 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 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

SPECIFICATIONS

	LS 12-25	LS 12-55	LS 12-80	LS 12-100	LS 6-200	LS 4-300	LS 2-600*
Nominal voltage	12 volts	12 volts	12 volts	12 volts	6 volts	4 volts	2 volts
Number of cells	6 / unit	6 / unit	6 / unit	6 / unit	3 / unit	2 / unit	1 / unit
Rated 8-hr capacity (ampere-hours to 1.75 Vpc)	25 Ah to 10.5 volts	52 Ah to 10.5 volts	80 Ah to 10.5 volts	100 Ah to 10.5 volts	200 Ah to 5.25 volts	300 Ah to 3.5 volts	600 Ah to 1.75 volts
Rated 15-min capacity (kilowatts to 1.67 Vpc) per cell	0.092	0.172	0.275	0.344	0.688	1.032	2.063
Internal resistance per cell	0.001730 Ohms	0.001570 Ohms	0.000940 Ohms	0.000786 Ohms	0.000393 Ohms	0.000262 Ohms	0.000131 Ohms
Short circuit current	1155 A	1274 A	2128 A	2545 A	5089 A	7634 A	15267 A
Unit height	7.11 in (181 mm)	9.20 in (251 mm)	9.90 in (251 mm)	9.90 in (251 mm)	9.90 in (251 mm)	9.90 in (251 mm)	9.90 in (251 mm)
Unit length (includes handles)	7.64 in (194 mm)	10.20 in (259 mm)	13.94 in (354 mm)	16.58 in (421 mm)	16.58 in (421 mm)	16.58 in (421 mm)	16.58 in (421 mm)
Unit width	5.20 in (132 mm)	6.80 in (173 mm)	6.84 in (174 mm)	6.84 in (174 mm)	6.84 in (174 mm)	6.84 in (174 mm)	6.84 in (174 mm)
Weight	23 lbs (10 kg)	56 lbs (25 kg)	79 lbs (36 kg)	95 lbs (43 kg)	95 lbs (43 kg)	95 lbs (43 kg)	95 lbs (43 kg)
Plate thickness positive	0.124 in (3.15 mm)				0.140 in (3.56 mm)		
negative	0.065 in (1.65 mm)				0.085 in (2.16 mm)		
Terminal characteristics	0.55 in diameter, threaded-brass insert, 0.50 in deep. Fasten with 10-32 stainless steel hex bolt/washer.			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 77F (25C) (PER CELL)

FV/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	LS12-25	36.1	34.8	29.3	26.7	18.1	11.5	7.0	5.2	4.1	3.4	2.9	2.3	1.9	1.0
	LS12-55	61.6	57.6	52.4	47.3	35.0	22.8	14.1	10.3	8.2	6.8	5.8	4.5	3.8	2.1
	LS12-80	98.6	92.1	83.8	75.7	56.0	36.6	22.5	16.5	13.1	10.8	9.2	7.2	6.0	3.3
	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	LS12-25	57.9	49.3	39.8	35.1	22.4	13.2	8.3	6.1	4.8	3.9	3.4	2.6	2.2	1.2
	LS12-55	93.7	84.7	73.5	63.4	43.7	27.7	16.7	12.1	9.5	7.9	6.7	5.2	4.3	2.3
	LS12-80	150.0	135.5	117.6	101.5	69.9	44.4	26.7	19.3	15.2	12.6	10.8	8.4	6.9	3.7
	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	LS12-25	64.7	53.2	42.4	36.9	23.4	13.8	8.7	6.4	5.0	4.1	3.5	2.8	2.3	1.2
	LS12-55	108.0	95.5	80.7	68.5	46.5	29.0	17.3	12.6	9.9	8.2	7.1	5.5	4.5	2.4
	LS12-80	172.6	153.2	129.5	109.5	74.0	46.7	27.9	20.2	16.0	13.2	11.2	8.7	7.2	3.8
	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	LS12-25	74.9	57.7	46.3	39.7	24.8	14.8	9.3	6.7	5.3	4.4	3.7	2.9	2.4	1.3
	LS12-55	129.3	112.1	91.7	76.0	50.7	31.2	18.6	13.4	10.6	8.8	7.5	5.8	4.7	2.5
	LS12-80	206.9	179.4	146.8	121.5	81.2	49.9	29.7	21.5	17.0	14.0	12.0	9.3	7.6	4.0
	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	LS12-25	78.8	61.2	47.5	40.5	25.2	15.0	9.4	6.8	5.4	4.4	3.8	2.9	2.4	1.3
	LS12-55	136.4	117.0	94.7	77.9	51.6	31.6	18.8	13.6	10.7	8.9	7.6	5.9	4.8	2.5
	LS12-80	218.2	187.1	151.4	124.7	82.6	50.6	30.1	21.8	17.2	14.2	12.1	9.4	7.7	4.0
	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	LS12-25	94.1	69.8	52.3	43.6	27.1	15.5	10.0	7.3	5.6	4.6	3.9	3.0	2.5	1.3
	LS12-55	164.7	136.2	106.5	85.9	55.0	33.5	19.9	14.3	11.3	9.3	7.9	6.1	5.0	2.6
	LS12-80	263.5	218.0	170.4	137.4	88.0	53.6	31.8	22.9	18.0	14.9	12.7	9.8	8.0	4.2
	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	LS12-25	101.7	73.2	54.2	44.6	27.6	15.7	10.1	7.3	5.7	4.7	4.0	3.1	2.5	1.3
	LS12-55	179.1	142.3	108.8	87.5	56.1	34.0	20.2	14.6	11.5	9.5	8.1	6.3	5.1	2.7
	LS12-80	286.7	227.3	174.5	140.2	89.6	54.4	32.2	23.2	18.3	15.1	12.8	9.9	8.1	4.2
	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	LS12-25	113.1	78.4	57.2	46.0	28.4	16.1	10.3	7.5	5.8	4.8	4.1	3.1	2.6	1.4
	LS12-55	200.9	151.1	112.7	90.2	57.5	34.7	20.5	14.9	11.8	9.8	8.4	6.5	5.3	2.8
	LS12-80	321.4	241.7	180.3	144.3	92.1	55.5	32.8	23.7	18.6	15.4	13.1	10.0	8.2	4.3
	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 manufactured to provide 95 percent of published rates at time of shipment at 8-hour rate to 1.75 Vpc.

RATINGS IN KILOWATTS AT 77F (25C) (PER CELL)

FV/Time	Models	1 Min	5 Min	10 Min	15 Min	20 Min	30 Min	1 Hr	3 Hr	5 Hr	8 Hr
1.95	LS12-25	0.070	0.068	0.058	0.053	0.043	0.036	0.023	0.010	0.007	0.005
	LS12-55	0.120	0.113	0.103	0.094	0.085	0.070	0.045	0.021	0.014	0.009
	LS12-80	0.200	0.188	0.172	0.156	0.141	0.116	0.076	0.034	0.023	0.015
	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	LS12-25	0.110	0.095	0.077	0.068	0.054	0.044	0.026	0.012	0.008	0.005
	LS12-55	0.178	0.162	0.142	0.123	0.108	0.086	0.055	0.024	0.016	0.010
	LS12-80	0.297	0.270	0.236	0.206	0.180	0.143	0.091	0.040	0.026	0.017
	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	LS12-25	0.139	0.111	0.088	0.076	0.061	0.048	0.029	0.013	0.008	0.006
	LS12-55	0.296	0.251	0.200	0.162	0.137	0.105	0.065	0.028	0.018	0.012
	LS12-80	0.399	0.351	0.291	0.242	0.207	0.163	0.101	0.044	0.029	0.019
	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	LS12-25	0.169	0.129	0.098	0.083	0.064	0.052	0.030	0.013	0.006	0.006
	LS12-55	0.296	0.251	0.200	0.162	0.137	0.105	0.065	0.028	0.018	0.012
	LS12-80	0.494	0.419	0.333	0.270	0.228	0.176	0.108	0.047	0.030	0.020
	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	LS12-25	0.198	0.142	0.106	0.086	0.067	0.054	0.031	0.014	0.010	0.006
	LS12-55	0.352	0.274	0.208	0.168	0.142	0.110	0.067	0.029	0.019	0.013
	LS12-80	0.586	0.456	0.347	0.281	0.237	0.183	0.112	0.048	0.031	0.021
	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	LS12-25	0.230	0.155	0.111	0.089	0.067	0.054	0.031			
	LS12-55	0.400	0.287	0.213	0.172	0.145	0.111	0.067			
	LS12-80	0.667	0.479	0.355	0.286	0.241	0.185	0.112			
	LS12-100	0.801	0.575	0.426	0.343	0.289	0.222	0.134			
	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	LS12-25	0.244	0.164	0.109	0.092						
	LS12-55	0.429	0.296	0.218	0.172						
	LS12-80	0.714	0.494	0.363	0.286						
	LS12-100	0.857	0.592	0.436	0.343						
	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	LS12-25	0.255	0.168	0.119	0.094						
	LS12-55	0.447	0.302	0.219	0.172						
	LS12-80	0.738	0.501	0.364	0.287						
	LS12-100	0.893	0.603	0.436	0.344						
	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	LS12-25	0.264	0.173	0.120	0.095						
	LS12-55	0.465	0.306	0.219	0.173						
	LS12-80	0.774	0.509	0.364	0.288						
	LS12-100	0.929	0.612	0.437	0.345						
	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							

Not recommended to discharge longer than 15 min. below 1.75 Vpc.

Note: Liberty Series 1000 batteries are manufactured to provide 95 percent of published rates at time of shipment at 8-hour rate to 1.75 Vpc.

FRONT-ACCESS BATTERIES



C&D designed the Front-Access valve regulated lead-acid batteries to provide easy front access to the battery terminals for installation and maintenance, saving end users both time and money. C&D's front-access products reduce the need for expensive rollout trays and drawers in cabinets or racks. The compact, lightweight designs provide optimal power in attractive footprints. Thick positive grids supply longer life and excellent long-duration discharge rates from 100 to 150 ampere-hours.*

For additional information, please see brochure 12-383.

**Liberty Series 1000 batteries are also available in Front-Access designs.*

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.

WIRING HARNESSES

Special wiring harnesses are available which speed battery installation, and circuit-enhancing electronics are offered to increase battery life.



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.

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.

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. Additionally, the Front-Access products are available in Integrated Rack Systems, complete standby power systems from C&D that include batteries, racks, and electronics.

For additional information on complete systems, please see brochure 10-966 and for racks and cabinets, please see brochure 12-380.

MODULAR RACK WITH PANELS



MODULAR RACK



C&D TECHNOLOGIES, INC.

STANDBY POWER DIVISION

1400 Union Meeting Road
P.O. Box 3053 • Blue Bell, PA 19422-0858
(215) 619-2700 • Fax (215) 619-7899 • (800) 543-8630
customersvc@cdtechno.com
www.cdtechno.com

Any data, descriptions or specifications presented herein are subject to revision by C&D Technologies, Inc. without notice. While such information is believed to be accurate as indicated herein, C&D Technologies, Inc. makes no warranty and hereby disclaims all warranties, express or implied, with regard to the accuracy or completeness of such information. Further, because the product(s) featured herein may be used under conditions beyond its control, C&D Technologies, Inc. hereby disclaims all warranties, either express or implied, concerning the fitness or suitability of such product(s) for any particular use or in any specific application or arising from any course of dealing or usage of trade. The user is solely responsible for determining the suitability of the product(s) featured herein for user's intended purpose and in user's specific application.

Copyright 2004 C&D TECHNOLOGIES, INC. Printed in U.S.A. 12-373 5M/0404/WLG/13