

THE *m-s endur*[™] SERIES VRLA BATTERY **THE TRUE LONG-LIFE BATTERY™**

FOR STANDBY APPLICATIONS
CAPACITIES FROM 295-1985 AMPERE-HOURS



The msEndur™ is the latest advancement in valve regulated lead-acid (VRLA) batteries for standby applications. By combining C&D Technologies' history of battery research and design with advanced MSE technology, C&D has created the msEndur — The True Long-Life Battery™. The msEndur batteries are unmatched in power density with space saving modular designs and have a 20-year design life to reduce the total cost of ownership.

Additionally, the msEndur comes in a low gravity option for paralleling with flooded battery strings and utilizing existing power equipment.

FEATURES & BENEFITS

ADVANCED SYSTEM FEATURES

- Modular design for ease of installation and stacking flexibility
- Space saving design for the greatest amount of power in a small footprint
- Certified as NEBS Level 3 compliant to Earthquake Risk Zone 4 in various system configurations
- Exceed 1997 UBC Zone 4 seismic requirements for at or below grade installations
- Exceed 2000/2003 IBC requirements for 125%g level
- Tin-plated copper connectors minimize maintenance
- Various accessories for customized system flexibility and expansion

ADVANCED MATERIALS

- Advanced microporous absorbed glass mat separators for ultra-low float current — reduces grid corrosion for a long, usable service life
- Proprietary calcium alloys to minimize positive grid corrosion and growth — maximizes battery life
- Robust thermoplastic container — enhances product quality and improves strength over other

container materials for safe operation with flammability rating UL-94: 5VB, LOI>32%

- Highly efficient, proprietary plate processing for high utilization of active material — results in high energy density

ADVANCED PROCESSES

- Advanced formation process results in a narrow float voltage window making on-site float matching unnecessary
- Highly controlled manufacturing processes for exceptional and consistent plate quality

ADVANCED SERVICE LIFE AND WARRANTY

- Proprietary cell design and manufacturing process provides for documented long-lasting service life
- Industry leading warranty

ADVANCED EXPERIENCE

- Nearly 100 years of experience in the battery industry
- The only producer and marketer of complete battery and electronics systems for total power solutions
- Fully backed by a worldwide network for local service

ADVANCED DESIGN FEATURES

1. Large Post Design

- Lower current resistance
- Larger area for easy access by test equipment

2. Computer-controlled Proprietary Heliarc Weld

- High quality consistent weld
- 100% tested for maximum reliability

3. Threaded Copper Inserted Post

- Reduces resistance to current
- Improves high rate performance
- High torque limit to 160 in-lbs
- Minimal maintenance required

4. Robust Post Seal Design

- Patented bonding process for bushing to cover seal
- Patented flexible post seal on msEndur AT-35

5. Proven Jar-to-Cover Seal

- More robust than competitive seal designs
- All cells are 100% factory tested
- Ensures maximum product reliability

6. Moss Shield

- Extends battery life by preventing premature shorting

7. Positive Grid Design

- Patented grid design reduces plate growth
- Thick lead-calcium-tin positive plate — 0.275 in (7mm) for 20-year design life

8. C-Wrap AGM

- Prevents plates from shorting on the sides and edges

9. Patented Ribbed Jar Design

- Provides extra strength, self-supporting container
- Provides space-efficient airflow gap for uniform cell temperatures
- Better heat dissipation optimizes life

10. Insulated Plate Boot

- Prevents shorting at bottom of plate
- Improves product quality

11. Deep Well Support Bridge

- Allows plate growth without affecting performance
- Reduces stress on jar-to-cover and post seals
- Supports the element in horizontal position
- Increases the life of battery

12. Cover and Container Material

- Flame-retardant PC/ABS blend provides improved thermal and strength properties

CELL SPECIFICATIONS

Cell Model	AT-07/ ATL-07	AT-09/ ATL-09	AT-11/ ATL-11	AT-15/ ATL-15	AT-19/ ATL-19	AT-23/ ATL-23	AT-27/ ATL-27	AT-35/ ATL-35
Nominal Voltage Rated Capacity (8 hr to 1.75)	345 / 293	460 / 391	575 / 489	805 / 684	1035 / 879	1265 / 1074	1495 / 1270	1985 / 1661
Positive Plates	3	4	5	7	9	11	13	17
Positive Plate Thickness	0.275 in (7mm)							
Specific Gravity	AT: 1.300 @ 77°F (25°C) / ATL: 1.250 @ 77°F (25°C)							
Recommended Operating Temperature	77°F (25°C)							
Depth in (mm)	23.1 (587.5)							
Height in (mm)	8.9 (226.0)							
Width in (mm)	3.0 (76.2)	3.8 (96.5)	4.5 (114.3)	5.9 (149.9)	7.4 (188.0)	8.9 (226.0)	10.3 (261.6)	13.4 (339.0)
Weight lbs (kg)	64 (29)	79 (36)	97 (44)	131 (59)	167 (75)	201 (91)	237 (108)	306 (139)
Connection Torque Initial/Re-Torque	160 in-lbs (18 N-m) / 125 in-lbs (14 N-m)							
Recommended Float Voltage	AT: 2.25 - 2.27 VPC at 77°F (25°C) / ATL: 2.19 - 2.21 VPC at 77°F (25°C)							
Charger Temperature/Voltage Correction:	+2mV/°F below 77°F (+3.6mV/°C below 25°C), -2mV/g°F above 77°F (-3.6mV/°C above 25°C)							

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

FV/Cell	Model	1 hr	2 hr	3 hr	4 hr	5 hr	6 hr	7 hr	8 hr
1.75	AT-07	186.3	122.2	92.5	74.9	63.1	54.6	48.1	43.1
	AT-09	248.3	163.0	123.3	99.8	84.1	72.7	64.2	57.4
	AT-11	310.4	203.7	154.1	124.8	105.1	90.9	80.2	71.8
	AT-15	434.6	285.2	215.8	174.7	147.1	127.3	112.3	100.5
	AT-19	558.8	366.7	277.4	224.6	189.2	163.7	144.4	129.2
	AT-23	682.9	448.2	339.1	274.5	231.2	200.1	176.5	157.9
	AT-27	807.1	529.7	400.7	324.4	273.2	236.4	208.5	186.7
	AT-35	1044.1	687.5	523.4	425.9	360.3	312.9	276.8	248.3
1.80	AT-07	172.7	114.7	87.5	71.3	60.4	52.5	46.5	41.8
	AT-09	230.2	152.9	116.6	95.1	80.5	70.0	62.0	55.7
	AT-11	287.8	191.1	145.8	118.8	100.7	87.5	77.5	69.6
	AT-15	402.9	267.5	204.1	166.3	141.0	122.6	108.5	97.5
	AT-19	518.0	344.0	262.4	213.9	181.2	157.6	139.6	125.3
	AT-23	633.2	420.4	320.7	261.4	221.5	192.6	170.6	153.2
	AT-27	748.3	496.9	379.0	308.9	261.8	227.6	201.6	181.0
	AT-35	971.9	646.7	495.8	405.8	345.1	300.9	267.1	240.4
1.84	AT-07	159.1	108.6	83.4	68.1	57.7	50.1	44.4	39.9
	AT-09	212.2	144.9	111.2	90.7	76.9	66.9	59.2	53.2
	AT-11	265.2	181.1	139.0	113.4	96.1	83.6	74.0	66.4
	AT-15	371.3	253.5	194.5	158.8	134.6	117.0	103.6	93.0
	AT-19	477.4	325.9	250.1	204.2	173.1	150.4	133.2	119.6
	AT-23	583.5	398.4	305.7	249.6	211.5	183.9	162.8	146.2
	AT-27	689.6	470.8	361.3	294.9	250.0	217.3	192.4	172.8
	AT-35	896.5	612.1	471.9	387.0	329.3	287.2	255.0	229.5
1.86	AT-07	150.6	104.4	80.5	65.8	55.8	48.6	43.0	38.6
	AT-09	200.8	139.2	107.3	87.8	74.5	64.8	57.4	51.5
	AT-11	251.0	174.0	134.1	109.7	93.1	80.9	71.7	64.4
	AT-15	351.4	243.6	187.8	153.6	130.3	113.3	100.4	90.1
	AT-19	451.9	313.2	241.4	197.5	167.5	145.7	129.0	115.9
	AT-23	552.3	382.8	295.1	241.3	204.7	178.1	157.7	141.6
	AT-27	652.7	452.4	348.8	285.2	242.0	210.5	186.4	167.4
	AT-35	849.4	589.0	456.1	374.7	319.2	278.5	247.4	222.7

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

FV/Cell	Model	1 min	5 min	10 min	15 min	20 min	30 min	45 min	1 hr
1.67	AT-07	0.802	0.758	0.699	0.641	0.586	0.498	0.412	0.357
	AT-09	1.070	1.010	0.932	0.854	0.781	0.664	0.549	0.476
	AT-11	1.337	1.263	1.166	1.068	0.977	0.830	0.687	0.596
	AT-15	1.872	1.768	1.632	1.495	1.367	1.162	0.962	0.834
	AT-19	2.407	2.273	2.098	1.922	1.758	1.494	1.236	1.072
	AT-23*	-	-	-	-	-	-	-	-
	AT-27	3.476	3.283	3.030	2.776	2.539	2.158	1.786	1.548
	AT-35*	-	-	-	-	-	-	-	-

*Contact C&D for rates

ATL RATINGS IN AMPERES AT 77F (25C) PER CELL

FV/Cell	Model	1 hr	2 hr	3 hr	4 hr	5 hr	6 hr	7 hr	8 hr
1.75	ATL-07	157.5	103.5	78.4	63.5	53.6	46.4	40.9	36.6
	ATL-09	210.0	138.0	104.5	84.7	71.4	61.8	54.6	48.9
	ATL-11	262.5	172.5	130.7	105.9	89.3	77.3	68.2	61.1
	ATL-15	367.5	241.5	182.9	148.2	125.0	108.2	95.5	85.5
	ATL-19	472.5	310.5	235.2	190.6	160.7	139.1	122.8	109.9
	ATL-23	577.5	379.5	287.5	232.9	196.4	170.0	150.0	134.3
	ATL-27	682.5	448.5	339.7	275.3	232.1	200.9	177.3	158.8
	ATL-35	892.5	586.5	444.3	360.0	303.5	262.8	231.9	207.6
1.80	ATL-07	146.1	96.9	73.8	60.0	50.8	44.1	39.0	35.0
	ATL-09	194.9	129.2	98.4	80.0	67.7	58.8	52.0	46.7
	ATL-11	243.6	161.5	123.0	100.1	84.6	73.5	65.0	58.3
	ATL-15	341.0	226.2	172.2	140.1	118.5	102.9	91.0	81.7
	ATL-19	438.4	290.8	221.4	180.1	152.4	132.3	117.0	105.0
	ATL-23	535.9	355.4	270.6	220.1	186.2	161.7	143.1	128.4
	ATL-27	633.3	420.0	319.7	260.1	220.1	191.1	169.1	151.7
	ATL-35	828.2	549.3	418.1	340.2	287.8	249.9	221.1	198.4
1.84	ATL-07	133.7	90.7	69.5	56.7	48.1	41.8	37.0	33.3
	ATL-09	178.2	120.9	92.7	75.6	64.1	55.8	49.4	44.3
	ATL-11	222.8	151.2	115.9	94.6	80.2	69.7	61.7	55.4
	ATL-15	311.9	211.6	162.2	132.4	112.2	97.6	86.4	77.6
	ATL-19	401.0	272.1	208.5	170.2	144.3	125.4	111.1	99.8
	ATL-23	490.1	332.6	254.9	208.0	176.3	153.3	135.8	121.9
	ATL-27	579.2	393.0	301.2	245.9	208.4	181.2	160.5	144.1
	ATL-35	757.4	514.0	393.9	321.5	272.5	237.0	209.8	188.4
1.86	ATL-07	125.8	87.0	67.1	54.9	46.6	40.6	36.0	32.3
	ATL-09	167.8	116.1	89.5	73.2	62.2	54.1	47.9	43.1
	ATL-11	209.7	145.1	111.9	91.6	77.7	67.6	59.9	53.8
	ATL-15	293.6	203.1	156.6	128.2	108.8	94.7	83.9	75.4
	ATL-19	377.5	261.1	201.4	164.8	139.9	121.7	107.9	96.9
	ATL-23	461.4	319.2	246.1	201.4	171.0	148.8	131.8	118.4
	ATL-27	545.3	377.2	290.9	238.0	202.1	175.8	155.8	140.0
	ATL-35	713.0	493.2	380.4	311.3	264.2	230.0	203.8	183.0

STANDARD AT SYSTEMS. 24VDC, 48VDC, 120VDC and 240VDC (FOR ATL SYSTEMS, SEE BELOW*)

Cell Model	System Voltage	Number of Cells	System Part/ Drawing Number*	Modules			Num. of Stacks	System*			
				Cell Layout Width X Height	Width/Stack			Height		Weight	
					in	mm		in	mm	lbs	kg
AT-07	24	12	R0762012CE01	6 x 2	21.4	545	1	24.8	630	1015	460
	48	24	R0764024CE01	6 x 4	21.4	545	1	44.7	1136	1970	894
	120	60	R0765060CE01	6 x 5	21.4	545	2	54.6	1389	4890	2218
	240	120	R0767120CE01	6 x 7	21.4	545	3	74.5	1895	9720	4409
AT-09	24	12	R0943012CE01	4 x 3	18.7	476	1	34.7	883	1265	574
	24	12	R0962012CE01	6 x 2	26.1	664	1	24.8	630	1240	562
	48	24	R0946024CE01	4 x 6	18.7	476	1	64.5	1642	2470	1120
	48	24	R0964024CE01	6 x 4	26.1	664	1	44.7	1136	2410	1093
	120	60	R0948060CE01	4 x 8	18.7	476	2	84.4	2148	6150	2790
AT-11	240	120	R0967120CE01	6 x 7	26.1	664	3	74.5	1895	11900	5398
	24	12	R1143012CE01	4 x 3	21.4	545	1	34.7	883	1490	676
	24	12	R1162012CE01	6 x 2	30.4	773	1	24.8	630	1460	662
	48	24	R1146024CE01	4 x 6	21.4	545	1	64.5	1642	2920	1324
	48	24	R1164024CE01	6 x 4	30.4	773	1	44.7	1136	2850	1293
	120	60	R1148060CE01	4 x 8	21.4	545	2	84.4	2148	7260	3293
AT-15	240	120	R1167120CE01	6 x 7	30.4	773	3	74.5	1895	14125	6407
	24	12	R1534012CE01	3 x 4	21.4	545	1	44.7	1136	1960	889
	24	12	R1543012CE01	4 x 3	27.9	708	1	34.7	883	1925	873
	48	24	R1538024CE01	3 x 8	21.4	545	1	84.4	2148	3860	1751
	48	24	R1546024CE01	4 x 6	27.9	708	1	64.5	1642	3790	1719
	120	60	R1548060CE01	4 x 8	27.9	708	2	84.4	2148	9430	4277
AT-19	240	120	R1567120CE01	6 x 7	39.5	1004	3	74.5	1895	18500	8391
	24	12	R1934012CE01	3 x 4	26.1	664	1	44.7	1136	2400	1089
	24	12	R1943012CE01	4 x 3	33.5	850	1	34.7	883	2370	1075
	48	24	R1938024CE01	3 x 8	26.1	664	1	84.4	2148	4740	2150
	48	24	R1946024CE01	4 x 6	33.5	850	1	64.5	1642	4670	2118
	120	60	R1948060CE01	4 x 8	33.5	850	2	84.4	2148	11560	5244
AT-23	240	120	R1948120CE01	4 x 8	33.5	850	4	84.4	2148	23260	10551
	24	12	R2334012CE01	3 x 4	30.4	773	1	44.7	1136	2850	1293
	24	12	R2343012CE01	4 x 3	39.5	1004	1	34.7	883	2810	1275
	48	24	R2338024CE01	3 x 8	30.4	773	1	84.4	2148	5620	2549
	48	24	R2346024CE01	4 x 6	39.5	1004	1	64.5	1642	5550	2517
AT-27	120	60	R2348060CE01	4 x 8	39.5	1004	2	84.4	2148	13830	6273
	24	12	R2734012CE01	3 x 4	34.4	875	1	44.7	1136	3310	1501
	24	12	R2743012CE01	4 x 3	45.5	1157	1	34.7	883	3310	1501
	48	24	R2738024CE01	3 x 8	34.4	875	1	84.4	2148	6550	2971
	48	24	R2746024CE01	4 x 6	45.5	1157	1	64.5	1642	6540	2966
	120	60	R2748060CE01	4 x 8	45.5	1157	2	84.4	2148	16310	7398
AT-35	240	120	R2748120CE01	4 x 8	45.5	1157	4	84.4	2148	32620	14796
	24	12	R3534012CE01	3 x 4	43.6	1108	1	44.7	1136	4200	1905
	24	12	R3526012CE01	2 x 6	30.4	773	1	64.5	1642	4240	1923
	48	24	R3538024CE01	3 x 8	43.6	1108	1	84.4	2148	8320	3774

*For ATL System Part Numbers and ATL System Drawing Numbers, replace the eleventh character with an "L" as shown in the example below. For System Voltage, Number of Cells, Modules, Number of Stacks, and System Dimensions, the information for ATL systems is the same as the AT information.

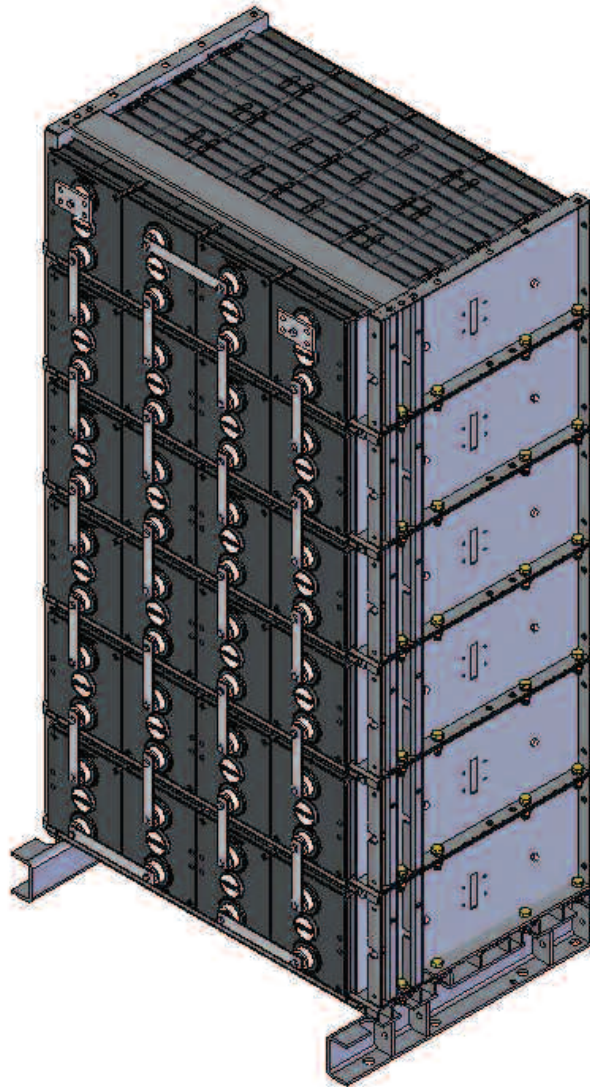
EXAMPLE

	System Part/Drawing Number*
AT-07	R0762012CE01
ATL-07	R0762012CEL1

+ Depth for all systems is 24.75 in (628.6 mm).

EXAMPLE

msEndur System: R1946024CE01-00
Cell model: AT-19
Number of cells: 24
System Voltage: 48
Modules: 4 x 6
Number of Stacks: 1



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

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