

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

**FOR STANDBY APPLICATIONS
CAPACITIES FROM 295-2038 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 UL94 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

- Over 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
8 hr to 1.75 at 77°F (25°C)	345 / 293	480 / 391	599 / 489	839 / 684	1079 / 879	1319 / 1074	1559 / 1270	2038 / 1661
10 hr to 1.80 at 68°F (20°C)	328/274	456/365	570/457	798/640	1026/821	1253/1004	1481/1187	1937/1552
Specific Gravity	AT: 1.300 @ 77°F (25°C) / ATL: 1.250 @ 77°F (25°C)							
Recommended Operating Temperature	77°F (25°C)							
Depth, inches (mm)	23.1 (587.5)							
Height, inches (mm)	8.9 (226.0)							
Width, inches (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)	63 (28)	80 (36)	98 (45)	132 (60)	167 (75)	204 (91)	237 (108)	317 (143)
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 Compensation Factor Temperature/Voltage	-2mV/°F above 77°F (-3.6mV/°C above 25°C), +2mV/°F below 77°F (+3.6mV/°C below 25°C)							

AT RATINGS TABLE
AMPERES @ 77°F (25°C)

FV/Cell	Model	1 hr	2 hr	3 hr	4 hr	5 hr	6 hr	8 hr	10 hr	12 hr	24 hr
1.75	AT-07	186	122	93	75	63	55	43	36	30	16
	AT-09	259	170	129	104	88	76	60	50	42	23
	AT-11	324	213	161	130	110	95	75	62	53	28
	AT-15	454	298	225	182	154	133	105	87	74	40
	AT-19	583	383	290	234	198	171	135	112	95	51
	AT-23	713	468	354	287	241	209	165	136	116	62
	AT-27	843	553	418	339	285	247	195	161	138	73
AT-35	1102	723	547	443	373	323	255	211	180	96	
1.80	AT-07	173	115	88	71	60	53	42	35	30	16
	AT-09	240	160	122	99	84	73	58	48	42	22
	AT-11	301	200	152	124	105	91	73	61	52	28
	AT-15	421	279	213	174	147	128	102	85	73	39
	AT-19	541	359	274	223	189	165	131	109	93	50
	AT-23	661	439	335	273	231	201	160	133	114	62
	AT-27	781	519	396	323	273	238	189	157	135	73
AT-35	1022	678	517	422	357	311	247	206	176	95	
1.84	AT-07	159	109	83	68	58	50	40	33	28	15
	AT-09	222	151	116	95	80	70	56	46	40	21
	AT-11	277	189	145	118	100	87	69	58	49	27
	AT-15	388	265	203	166	141	122	97	81	69	37
	AT-19	498	340	261	213	181	157	125	104	89	48
	AT-23	596	410	315	258	218	190	151	125	107	58
	AT-27	720	492	377	308	261	227	180	150	128	69
AT-35	921	634	487	398	337	293	233	194	166	89	
1.86	AT-07	151	104	81	66	56	49	39	32	28	15
	AT-09	210	145	112	92	78	68	54	45	38	21
	AT-11	262	182	140	115	97	85	67	56	48	26
	AT-15	367	254	196	160	136	118	94	78	67	36
	AT-19	472	327	252	206	175	152	121	101	86	47
	AT-23	577	400	308	252	214	186	148	123	105	57
	AT-27	681	472	364	298	253	220	175	145	124	67
AT-35	891	618	476	389	330	287	229	190	163	88	
1.88	AT-07	141	99	77	63	54	47	37	31	27	14
	AT-09	196	138	107	88	74	65	52	43	37	20
	AT-11	245	172	134	110	93	81	65	54	46	25
	AT-15	343	241	187	153	130	113	90	75	65	35
	AT-19	441	310	240	197	167	146	116	97	83	45
	AT-23	538	379	294	241	205	178	142	118	101	55
	AT-27	636	448	347	285	242	211	168	140	120	65
AT-35	832	585	454	372	316	275	219	183	157	85	
1.90	AT-07	131	94	73	60	51	45	36	30	25	14
	AT-09	182	130	102	84	71	62	50	41	35	19
	AT-11	227	163	127	104	89	78	62	52	44	24
	AT-15	318	228	178	146	125	109	87	72	62	34
	AT-19	409	293	228	188	160	140	111	93	80	43
	AT-23	500	358	279	230	196	171	136	113	97	53
	AT-27	591	423	330	272	231	202	161	134	115	62
AT-35	773	553	432	355	302	264	210	175	150	81	

These batteries are manufactured to provide 100 percent of published rates at time of shipment from factory
 Additional ratings available on the C&D Technologies Standby Power Selection Application Program at www.cdstandbypower.net

KILOWATTS PER CELL AT 77°F (25°C)

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	1.117	1.055	0.973	0.892	0.816	0.693	0.574	0.497
	AT-11	1.396	1.318	1.217	1.115	1.020	0.866	0.717	0.622
	AT-15	1.954	1.846	1.704	1.561	1.427	1.213	1.004	0.870
	AT-19	2.512	2.373	2.190	2.007	1.835	1.559	1.291	1.119
	*								
	AT-27	3.629	3.428	3.164	2.898	2.651	2.253	1.864	1.617
	*								

* AT/ATL-23 & 35 not available for rates less than 1 Hr.
 These batteries are manufactured to provide 100 percent of published rates at time of shipment from factory

ATL RATINGS TABLE
AMPERES @ 77°F (25°C)

FV/Cell	Model	1 hr	2 hr	3 hr	4 hr	5 hr	6 hr	8 hr	10 hr	12 hr	24 hr
1.75	ATL-07	158	104	78	64	54	46	37	30	26	14
	ATL-09	210	138	105	85	71	62	49	40	35	18
	ATL-11	263	173	131	106	89	77	61	51	43	23
	ATL-15	368	242	183	148	125	108	86	71	60	32
	ATL-19	473	311	235	191	161	139	110	91	78	42
	ATL-23	578	380	288	233	196	170	134	111	95	51
	ATL-27	683	449	340	275	232	201	159	131	112	60
ATL-35	893	587	444	360	304	263	208	172	147	78	
1.80	ATL-07	146	97	74	60	51	44	35	29	25	13
	ATL-09	195	129	98	80	68	59	47	39	33	18
	ATL-11	244	162	123	100	85	74	58	49	42	22
	ATL-15	341	226	172	140	119	103	82	68	58	31
	ATL-19	438	291	221	180	152	132	105	87	75	40
	ATL-23	536	355	271	220	186	162	128	107	91	49
	ATL-27	633	420	320	260	220	191	152	126	108	58
ATL-35	828	549	418	340	288	250	198	165	141	76	
1.84	ATL-07	134	91	70	57	48	42	33	28	24	13
	ATL-09	178	121	93	76	64	56	44	37	32	17
	ATL-11	223	151	116	95	80	70	55	46	40	21
	ATL-15	312	212	162	132	112	98	78	65	55	30
	ATL-19	401	272	209	170	144	125	100	83	71	38
	ATL-23	490	333	255	208	176	153	122	101	87	47
	ATL-27	579	393	301	246	208	181	144	120	103	55
ATL-35	757	514	394	322	273	237	188	157	134	73	
1.86	ATL-07	126	87	67	55	47	41	32	27	23	12
	ATL-09	168	116	90	73	62	54	43	36	31	17
	ATL-11	210	145	112	92	78	68	54	45	38	21
	ATL-15	294	203	157	128	109	95	75	63	54	29
	ATL-19	378	261	201	165	140	122	97	81	69	37
	ATL-23	461	319	246	201	171	149	118	99	84	46
	ATL-27	545	377	291	238	202	176	140	117	100	54
ATL-35	713	493	380	311	264	230	183	152	131	71	
1.88	ATL-07	116	83	64	53	45	39	31	26	22	12
	ATL-09	155	110	86	71	60	52	42	35	30	16
	ATL-11	194	138	107	88	75	65	52	43	37	20
	ATL-15	272	193	150	124	105	92	73	61	52	28
	ATL-19	349	248	193	159	135	118	94	78	67	36
	ATL-23	427	303	236	194	165	144	115	96	82	44
	ATL-27	504	359	279	230	195	170	136	113	97	52
ATL-35	659	469	365	300	255	223	177	148	127	68	
1.90	ATL-07	107	78	62	51	44	38	30	25	22	12
	ATL-09	142	104	82	68	58	51	40	34	29	16
	ATL-11	178	130	103	85	73	63	51	42	36	19
	ATL-15	249	183	144	119	102	89	71	59	50	27
	ATL-19	320	235	185	153	131	114	91	76	65	35
	ATL-23	391	287	226	187	160	139	111	92	79	43
	ATL-27	462	339	268	221	189	165	131	109	94	51
ATL-35	605	444	350	289	247	215	172	143	122	66	

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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.

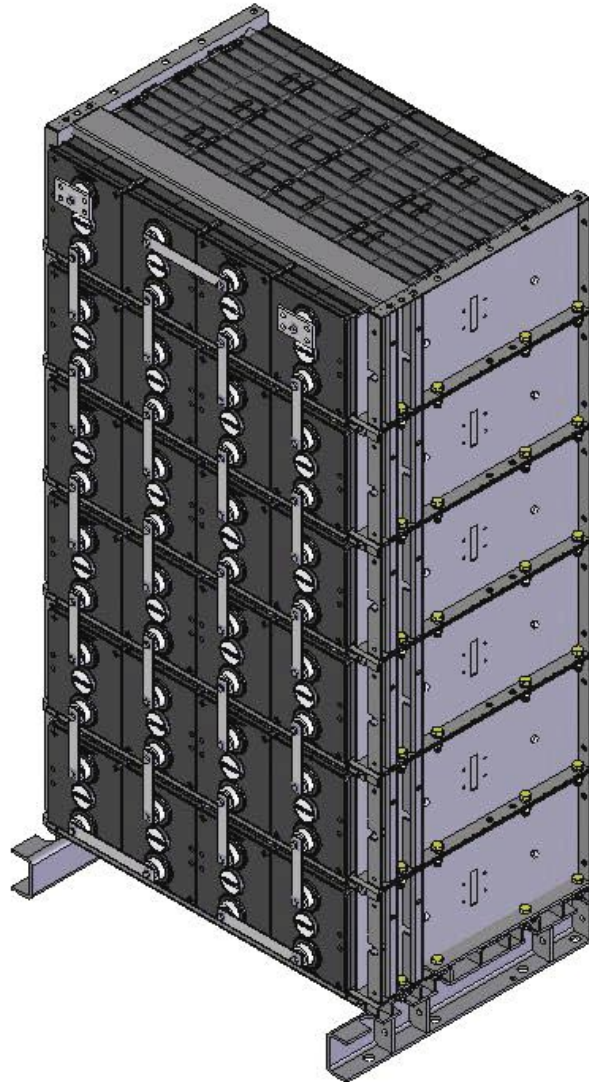
EXAMPLE

	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



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