

# the power of tomorrow

CLEAN ENERGY DEFINES THE WORLD THAT WE LIVE IN TODAY AND TOMORROW.  
LEAD CRYSTAL® TECHNOLOGY CREATES POWER THAT IS CLEAN SAFE AND  
HIGH PERFORMING FOR A BETTER FUTURE

**LEAD  
CRYSTAL®  
BATTERIES**

POWERED BY  
**Betta Batteries**

# LEAD CRYSTAL<sup>®</sup> BATTERIES

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## SPECIFICATION

Nominal Voltage	12V		
Rated Capacity (10 hour rate)	155 AH		
Dimension	Total Height (top of terminal)	283 mm	11.14"
	Height	283 mm	11.14"
	Length	559 mm	22.00"
	Width	125 mm	4.92"

Weight	Approximately 45kg / 99.20lbs		
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Capacity 25°C	120 hour rate (1.55A)	186 AH
	20 hour rate (8.5A)	170 AH
	10 hour rate (15.5A)	155 AH

Internal Resistance	Fully charged Battery (25°C)	3.5mΩ
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Self-Discharge 25°C	Capacity after 3 month storage	95%
	Capacity after 6 month storage	85%
	Capacity after 12 month storage	80%

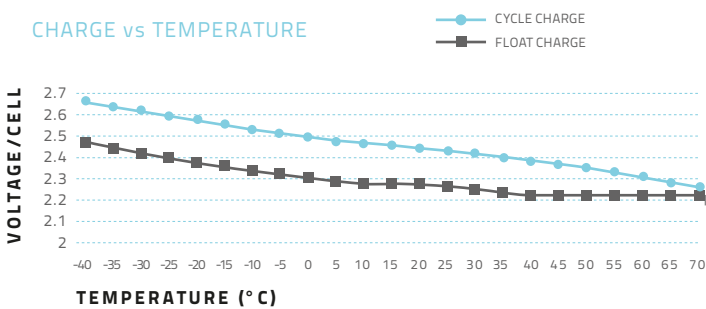
Max Discharge Current 25°C	1550A (5S)
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Terminal	Standard	F4
	Optional	
Charging (Constant Voltage)	Cycle	Initial Charging Current 46.5A 14.7V/ (25°C)
	Float	13.6V/ (25°C)

## DISCHARGE CURRENT AND END VOLTAGE

Discharge current (A)	End voltage (V)
0.05C or below or Intermittent discharge	11.4
0.05C of current close to it	11.1
0.1C of current close to it	10.8
0.2C of current close to it	10.5
From 0.2C to 0.5C	10.2
From 0.5C to 1C	9.6
From 1C to 3C	9.0
Current in excess of 3C	7.8

## CHARGE vs TEMPERATURE



## CHARGE vs TEMPERATURE CHART

temperature	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70
Cycle Charge	2.66	2.64	2.62	2.60	2.58	2.56	2.54	2.52	2.50	2.48	2.47	2.47	2.45	2.45	2.43	2.41	2.39	2.37	2.35	2.33	2.31	2.29	2.27
Float Charge (voltage/cell)	2.46	2.44	2.42	2.40	2.38	2.36	2.34	2.32	2.31	2.30	2.29	2.29	2.29	2.27	2.26	2.24	2.23	2.23	2.23	2.23	2.23	2.23	2.23

## CONSTANT CURRENT DISCHARGE CHARACTERISTICS: UNITS AMPERES (25°C)

End Voltage per cell	5min	15min	30min	45min	1h	2h	3h	4h	5h	6h	8h	10h	12h	20h	24h
1.60V	568.79	301.01	181.88	132.60	106.80	61.19	44.44	34.85	29.73	25.27	19.26	16.04	13.46	8.76	7.16
1.67V	528.61	291.15	179.18	131.69	106.61	60.93	43.63	34.67	29.30	25.09	19.24	15.86	13.44	8.74	7.13
1.70V	523.22	286.69	177.38	129.91	105.73	60.39	43.36	34.49	28.85	24.82	19.17	15.86	13.40	8.71	7.12
1.75V	479.32	277.70	175.62	129.02	103.93	59.22	43.18	34.06	28.58	24.64	19.08	15.68	13.33	8.67	7.11
1.80V	430.03	259.78	168.42	125.43	101.24	58.33	43.01	33.96	28.22	24.37	18.99	15.50	13.26	8.38	7.10
1.83V	411.06	238.33	165.76	120.96	96.77	57.79	41.30	32.52	27.60	23.47	18.59	14.87	12.72	8.29	7.00
1.85V	385.21	231.14	155.00	116.48	94.07	55.46	40.23	32.07	26.88	22.70	18.37	14.69	12.54	8.20	6.94

## DISCHARGE DATA WITH CONSTANT POWER UNITS: WATTS PER CELL (25°C)

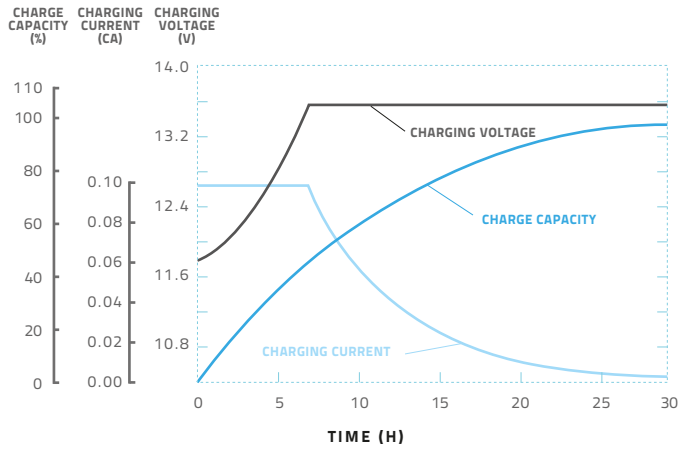
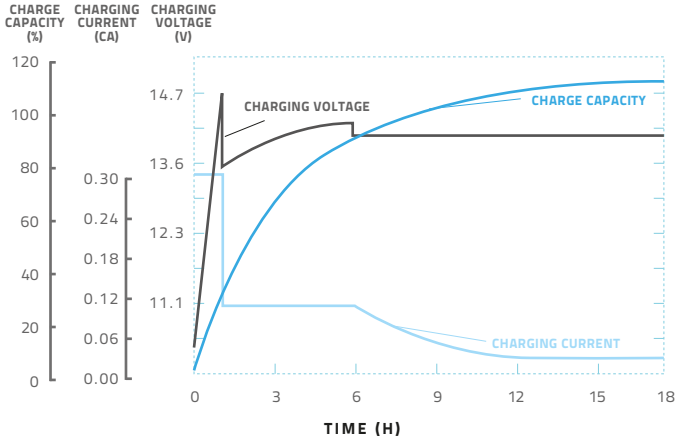
End Voltage per cell	5min	15min	30min	45min	1h	2h	3h	4h	5h	6h	8h	10h	12h	20h	24h
1.60V	950.45	528.54	340.42	248.14	199.62	115.56	84.48	66.92	56.53	48.55	37.45	31.00	26.07	17.38	14.24
1.67V	904.78	520.48	326.65	246.36	199.77	115.56	83.40	66.83	56.53	48.46	37.45	30.91	26.07	17.38	14.24
1.70V	899.40	516.89	326.50	246.36	197.97	114.67	83.22	66.58	55.63	48.11	37.18	30.64	25.80	17.29	14.24
1.75V	837.60	510.62	326.86	246.35	197.08	113.77	83.05	66.47	55.45	47.75	37.00	30.43	25.80	17.29	14.15
1.80V	768.63	484.64	319.81	241.87	196.19	113.77	82.95	66.29	55.09	47.75	36.91	30.28	25.80	16.84	14.15
1.83V	741.74	445.23	317.13	234.71	188.12	112.87	80.62	64.05	54.47	46.23	36.91	29.38	25.35	16.66	14.06
1.85V	687.10	435.37	294.73	225.76	182.75	110.19	78.39	63.25	52.94	45.33	35.48	29.11	24.90	16.48	13.98

CYCLE CHARGE CHARACTERISTIC (25°C)

FLOATING CHARGE CHARACTERISTIC (25°C)

REGULAR CYCLE CHARGE CHARACTERISTICS 77°F (25°C)

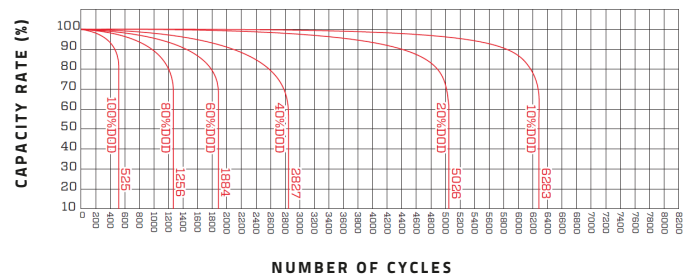
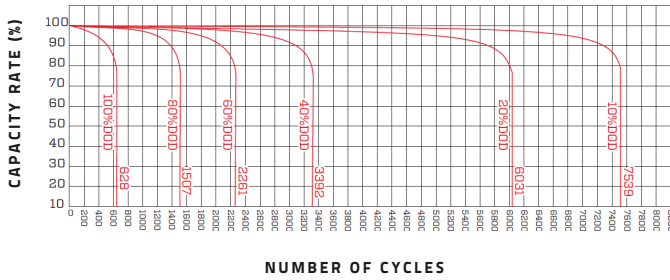
FLOATING CHARGE CHARACTERISTICS 77°F (25°C)



CYCLE LIFE CURVE GRAPH

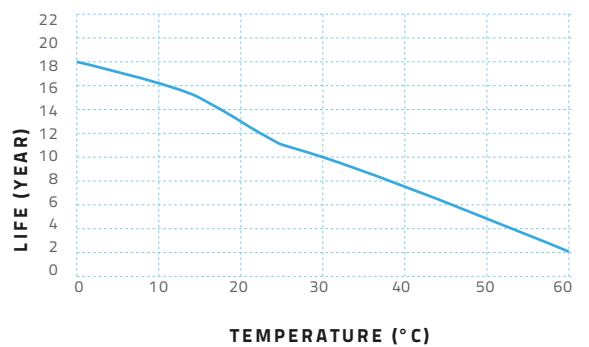
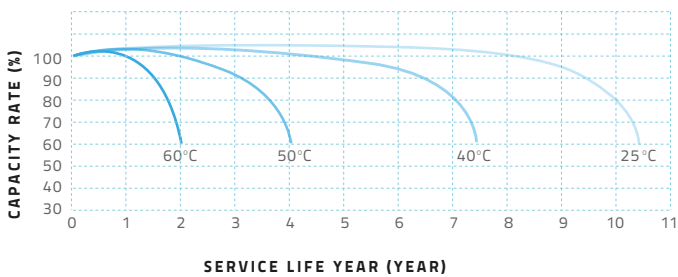
CYCLE LIFE CURVE GRAPH (25°C)

CYCLE LIFE CURVE GRAPH (40°C)

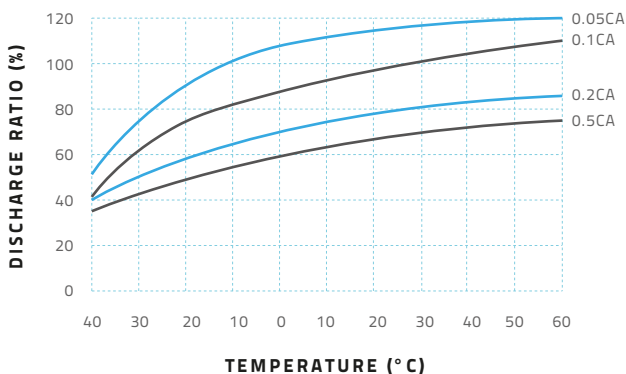


TEMPERATURE & FLOAT SERVICE LIFE

FLOAT SERVICE LIFE CURVE GRAPH



TEMPERATURE & DISCHARGE CAPACITY





## LEAD CRYSTAL®: CHANGING THE FUTURE

**Performance** Robust, resilient, high performing. Lead Crystal® batteries can be discharged deeper, cycled more often (also in extreme temperatures) and have a longer service life. They recover to full rated capacity over and over again.

**Technology** A unique micro-porous high absorbent mat (AGM), high-purity lead calcium selenium plates, safe SiO<sub>2</sub> electrolyte solution that solidifies into a white crystalline powder when charged/discharged.

**Cleaner & safe** Less acid, no cadmium, no antimony. Lead Crystal® batteries are up to 99% recyclable and are classified as non-hazardous goods for transport.

**Markets** Lead Crystal® batteries are being used in telecoms, ups, petrochem/marine, defence, renewable energy, health care, manufacturing, transportation and electric motion (wheelchairs, golf carts & trolleys).

