

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



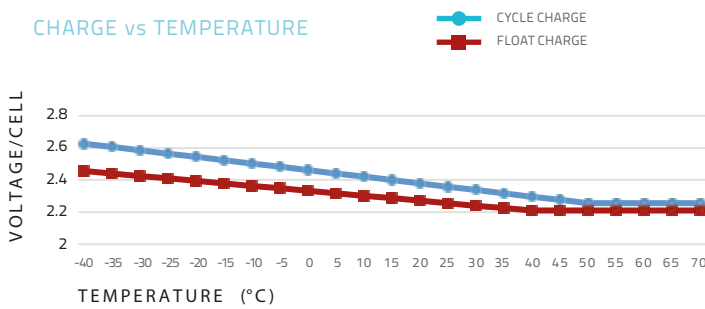
SPECIFICATION

Nominal Voltage	12V		
Rated Capacity (10 hour rate)	190 AH		
Dimension	Total Height (top of terminal)	320 mm	12.60"
	Height	320 mm	12.60"
	Length	546 mm	21.50"
	Width	125 mm	4.92"
Weight	Approximately 51.0 kg / 112.33 lbs		
Capacity 25°C	120 hour rate (1.8A)	216 AH	
	20 hour rate (10A)	200 AH	
	10 hour rate (19A)	190 AH	
Internal Resistance	Fully charged battery (25°C)	≈<6.0mΩ	
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	1900A (5S)		
Terminal	Standard	F8	
	Optional		
Charging (Constant Voltage)	Cycle	Initial Charging Current 36A or small 14.4V ~ 14.7V (25°C)	
	Float	13.5V ~ 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)

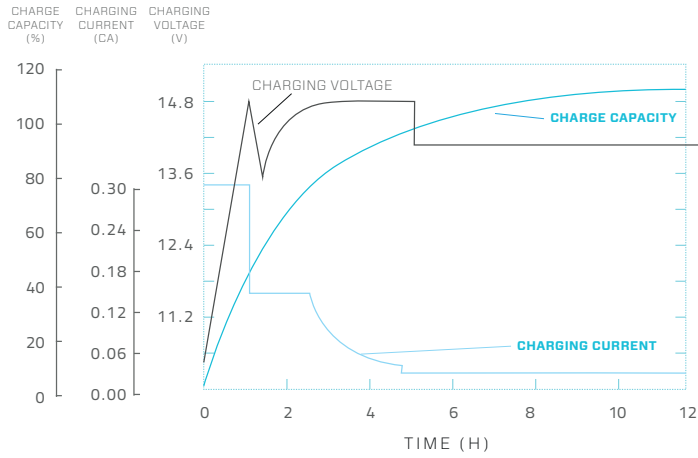
	5min	15min	30min	45min	1h	2h	3h	4h	5h	6h	8h	10h	12h	20h	24h
1.60V	697	369	223	163	131	75.0	54.5	42.7	36.4	31.0	23.6	19.7	16.5	10.7	8.78
1.67V	648	357	220	161	131	74.7	53.5	42.5	35.9	30.8	23.6	19.4	16.5	10.7	8.74
1.70V	641	351	217	159	130	74.0	53.2	42.3	35.4	30.4	23.5	19.4	16.4	10.7	8.73
1.75V	588	340	215	158	127	72.6	52.9	41.7	35.0	30.2	23.4	19.2	16.3	10.6	8.72
1.80V	527	318	206	154	124	71.5	52.7	41.6	34.6	29.9	23.3	19.0	16.3	10.3	8.70
1.83V	504	292	203	148	119	70.8	50.6	39.9	33.8	28.8	22.8	18.2	15.6	10.2	8.59
1.85V	472	283	190	143	115	68.0	49.3	39.3	32.9	27.8	22.5	18.01	15.37	10.05	8.51

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	1104	614	395	288	232	134	98.1	77.7	65.6	56.4	43.5	36.0	30.3	20.2	16.5
1.67V	1051	604	379	286	231	134	96.9	77.6	65.6	56.3	43.5	35.9	30.3	20.2	16.5
1.70V	1044	600	378	286	230	133	96.3	77.3	64.6	55.9	43.2	35.6	30.0	20.1	16.5
1.75V	973	593	377	286	229	132	95.3	77.2	64.4	55.4	43.0	35.3	30.0	20.1	16.4
1.80V	893	563	371	281	228	132	94.0	77.0	64.0	55.4	42.9	35.2	30.0	19.6	16.4
1.83V	861	517	368	273	218	131	92.5	74.4	63.3	53.7	42.9	34.1	29.4	19.4	16.3
1.85V	798	506	342	262	212	128	91.0	73.4	61.5	52.6	41.2	33.8	28.9	19.1	16.2

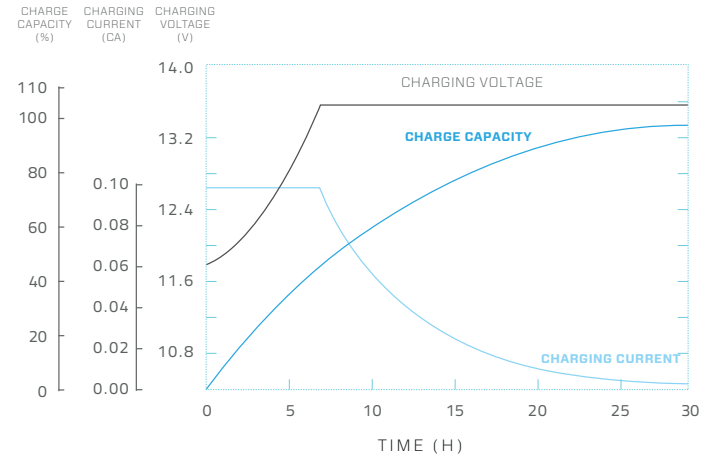
CYCLE CHARGE CHARACTERISTIC (25°C)

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



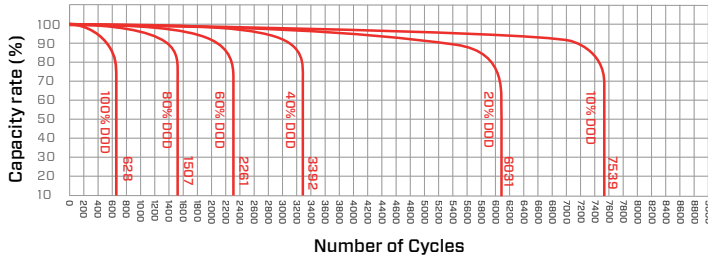
FLOATING CHARGE CHARACTERISTIC (25°C)

FLOATING CHARGE CHARACTERISTICS 77°F (25°C)

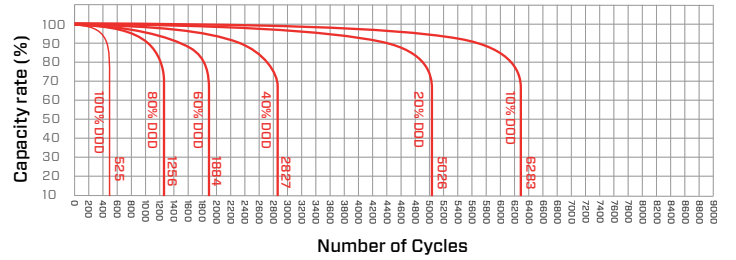


CYCLE LIFE CURVE GRAPH

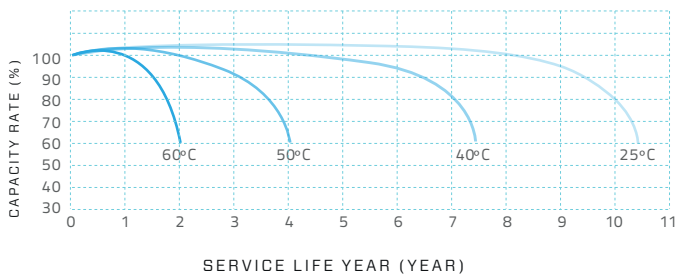
Cycle life curve graph (25°C) 12V



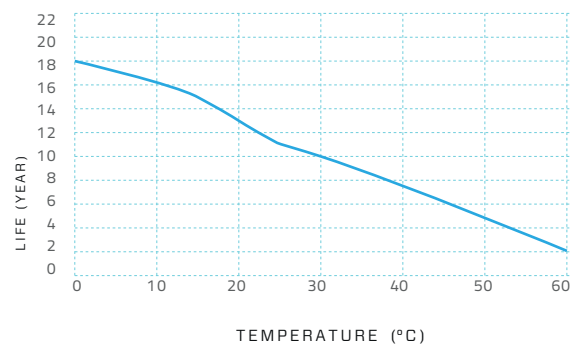
Cycle life curve graph (40°C) 12V



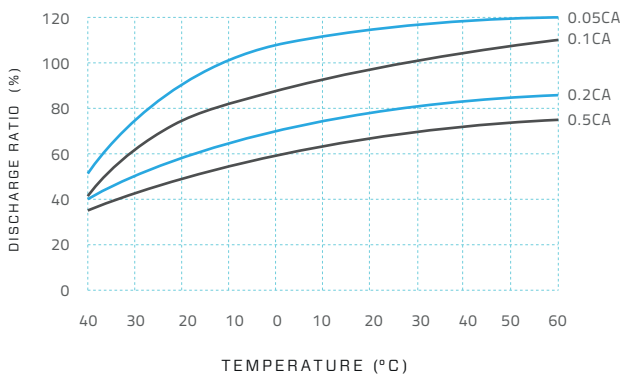
TEMPERATURE & FLOAT SERVICE LIFE



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 SiO₂ 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).

