

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) | 90 AH | | |
| Dimension | Total Height | 240mm | 9.44" |
| | Height | 206mm | 8.11" |
| | Length | 306mm | 12.05" |
| | Width | 174mm | 6.85" |
| Weight | Approximately 28kg / 61.72 lbs | | |

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 |

| Capacity | 120 hour rate (0.9A) | 108 AH |
|----------|----------------------|--------|
| 25° C | 20 hour rate (5.0A) | 100 AH |
| | 10 hour rate (9A) | 90 AH |

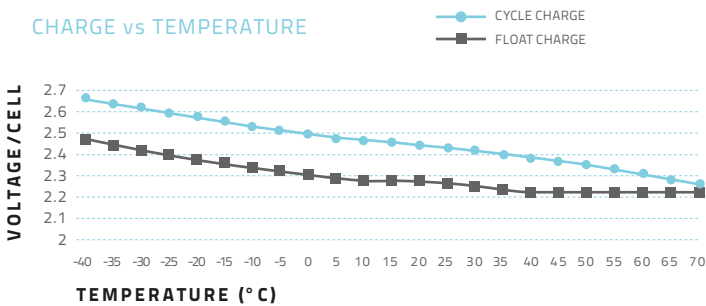
| Internal Resistance | Fully charged Battery (25° C) | 6.3mΩ |
|---------------------|-------------------------------|-------|
|---------------------|-------------------------------|-------|

| 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 | 900A(5S) |
|-----------------------------|----------|
|-----------------------------|----------|

| Terminal | Standard | F3 |
|-----------------------------|----------|--|
| | Optional | |
| Charging (Constant Voltage) | Cycle | Initial Charging Current 27A 14.7V/ (25° C) |
| | Float | 13.6V/ (25° C) |

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 | 330.26 | 174.78 | 105.61 | 76.99 | 62.01 | 35.53 | 25.80 | 20.24 | 17.26 | 14.67 | 11.18 | 9.31 | 7.82 | 5.09 | 4.16 |
| 1.67V | 306.94 | 169.06 | 104.04 | 76.46 | 61.90 | 35.38 | 25.34 | 20.13 | 17.01 | 14.57 | 11.17 | 9.21 | 7.80 | 5.07 | 4.14 |
| 1.70V | 303.80 | 166.46 | 103.00 | 75.43 | 61.39 | 35.06 | 25.18 | 20.03 | 16.75 | 14.41 | 11.13 | 9.21 | 7.78 | 5.06 | 4.14 |
| 1.75V | 278.32 | 161.24 | 101.97 | 74.92 | 60.35 | 34.39 | 25.07 | 19.78 | 16.60 | 14.31 | 11.08 | 9.10 | 7.74 | 5.04 | 4.13 |
| 1.80V | 249.70 | 150.84 | 97.79 | 72.83 | 58.79 | 33.87 | 24.97 | 19.72 | 16.39 | 14.15 | 11.03 | 9.00 | 7.70 | 4.86 | 4.12 |
| 1.83V | 238.68 | 138.38 | 96.25 | 70.24 | 56.19 | 33.55 | 23.98 | 18.88 | 16.02 | 13.63 | 10.79 | 8.64 | 7.39 | 4.81 | 4.07 |
| 1.85V | 223.67 | 134.21 | 90.00 | 67.63 | 54.62 | 32.20 | 23.36 | 18.62 | 15.61 | 13.18 | 10.67 | 8.53 | 7.28 | 4.76 | 4.03 |

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

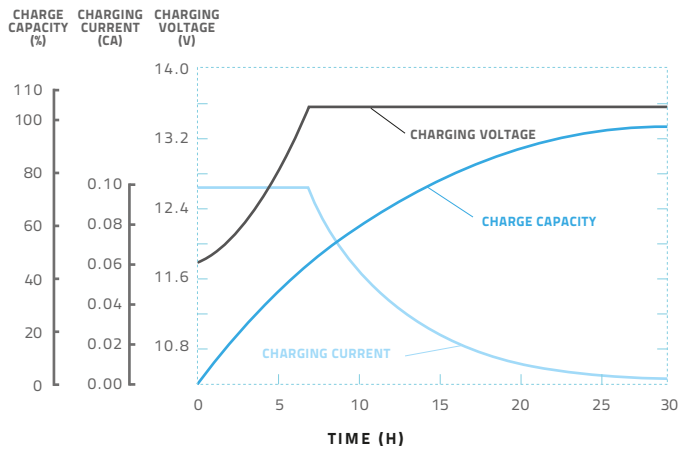
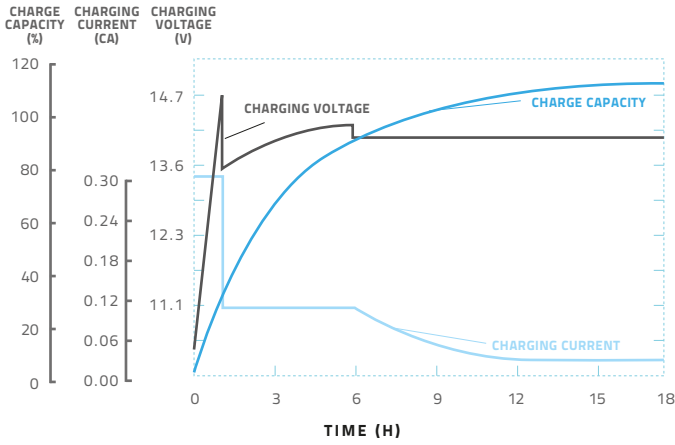
| End Voltage per cell | 5min | 15min | 30min | 45min | 1h | 2h | 3h | 4h | 5h | 6h | 8h | 10h | 12h | 20h | 24h |
|----------------------|--------|--------|--------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|
| 1.60V | 551.88 | 306.90 | 197.66 | 144.08 | 115.91 | 67.10 | 49.05 | 38.86 | 32.82 | 28.19 | 21.74 | 18.00 | 15.14 | 10.09 | 8.27 |
| 1.67V | 525.36 | 302.21 | 189.67 | 143.05 | 116.00 | 67.10 | 48.43 | 38.80 | 32.82 | 28.14 | 21.74 | 17.95 | 15.14 | 10.09 | 8.27 |
| 1.70V | 522.23 | 300.13 | 189.58 | 143.05 | 114.95 | 66.58 | 48.32 | 38.66 | 32.30 | 27.93 | 21.59 | 17.79 | 14.98 | 10.04 | 8.27 |
| 1.75V | 486.35 | 296.49 | 189.79 | 143.04 | 114.44 | 66.06 | 48.22 | 38.60 | 32.20 | 27.72 | 21.48 | 17.67 | 14.98 | 10.04 | 8.22 |
| 1.80V | 446.30 | 281.40 | 185.70 | 140.44 | 113.92 | 66.06 | 48.17 | 38.49 | 31.99 | 27.72 | 21.43 | 17.58 | 14.98 | 9.78 | 8.22 |
| 1.83V | 430.69 | 258.52 | 184.14 | 136.28 | 109.23 | 65.54 | 46.81 | 37.19 | 31.63 | 26.84 | 21.43 | 17.06 | 14.72 | 9.68 | 8.17 |
| 1.85V | 398.96 | 252.79 | 171.13 | 131.09 | 106.11 | 63.98 | 45.51 | 36.72 | 30.74 | 26.32 | 20.60 | 16.91 | 14.46 | 9.57 | 8.11 |

CYCLE CHARGE CHARACTERISTIC (25°C)

FLOATING CHARGE CHARACTERISTIC (25°C)

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

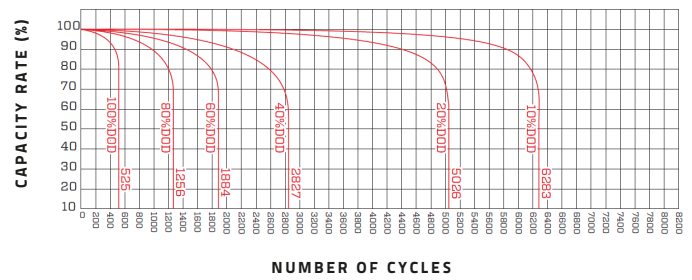
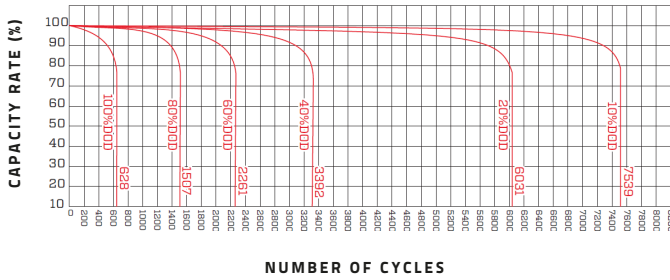
FLOATING CHARGE CHARACTERISTICS 77°F (25°C)



CYCLE LIFE CURVE GRAPH

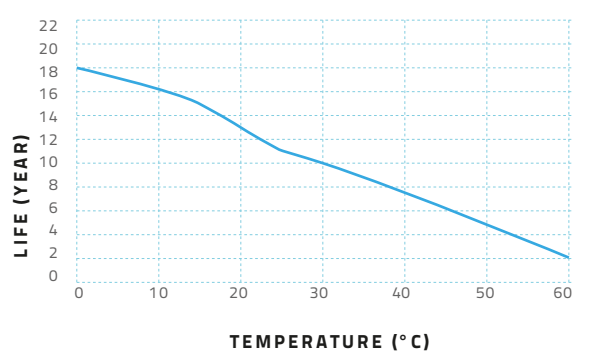
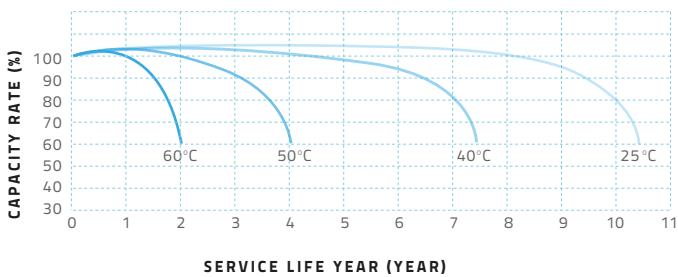
CYCLE LIFE CURVE GRAPH (25°C)

CYCLE LIFE CURVE GRAPH (40°C)

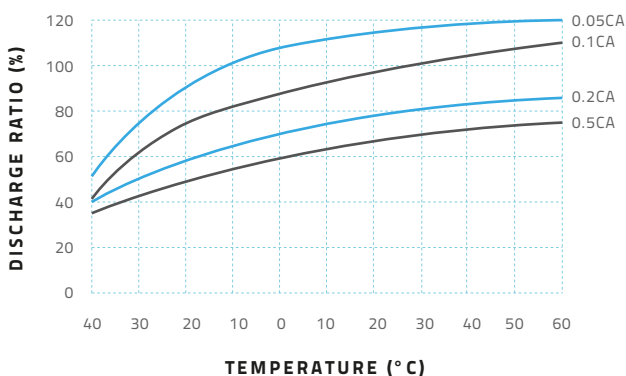


TEMPERATURE & FLOAT SERVICE LIFE

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 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).

