

147180


**Energy Products**

The unique design of the Gates Energy Cell overcomes many of the former limitations of the lead-acid system. At the same time, it retains the low cost, reliability, ruggedness and long life which have always been assets of the lead-acid battery. The cell is truly sealed—no acid, acid vapor or water loss—and incorporates recombination of gases within a starved electrolyte system. This unique maintenance-free rechargeable lead-acid cell is constructed with thin, spirally wound, pure lead plates which result in low impedance, low corrosion and long life. The self-sealing safety valve will vent under abusive overcharge conditions at an internal pressure of about 50 psi.

- Can be charged or discharged in any position.
- Use constant current or constant voltage charging.
- The same cell can be used for fast cycling or long-term float applications.

- Low internal impedance allows very high discharge currents.
- No loss of electrolyte during normal overcharging.
- Excellent mechanical and vibrational strength
- Absolutely no "memory" effects.
- No damage due to cell reversal.
- The metal can is electrically isolated preventing accidental shorting.
- Fewer cells per battery for lower battery cost and better reliability.
- Cells can be paralleled for additional capacity.
- Can be used safely in proximity of electronic circuitries
- Construction allows air transportation without restriction due to IATA "dry battery" classification.

#### TYPICAL SPECIFICATIONS ( $T_A = 25^\circ\text{C}$ )

Nominal Cell Voltage	2.0V	*Internal Resistance (max) (Charged Cell)	$10 \times 10^{-3} \Omega$
Capacity Rating		Storage Time	
20 hour rate (125mA)	2.7Ah	$T_A = 0^\circ\text{C}$	7,200 days
10 hour rate (250mA)	2.5Ah	$T_A = 23^\circ\text{C}$	1,200 days
1 hour rate (2.5A)	1.8Ah	$T_A = 65^\circ\text{C}$	60 days
Cell Power Rating		Atmospheric Pressure Range	0-8 atmospheres
Peak Power (at 135A)	135 W	Cell Charging	
Energy/unit volume (at C/10 rate)	1.47 W-h/in <sup>3</sup> 0.09 W-h/cm <sup>3</sup>	Constant Voltage (Cyclic)	2.40-2.60V
Energy/unit weight (at C/10 rate)	12.5 W-h/lb 27.5 W-h/kg	(Float)	2.30-2.40V
Cell Temperature Range		Constant Current (Cyclic) (max)	C/3 rate
Storage	-65°C to +65°C	(Float) (max)	C/500 rate
Discharge	-65°C to +65°C	**Cycle Life	200 - 2,000 cycles
Charge	-40°C to +65°C	***Expected Float Life	8 years

\*Measured on Hewlett-Packard 4328A milliohm meter.

\*\*200 cycles—100% depth of discharge, one cycle per day (Charge: 2.45V constant voltage, no current limit; Discharge C/5 rate)

2000 cycles—25% depth of discharge (Charge: 2.45V/cell for 7.5 hrs—2.0A current limit, Discharge: C/2 rate for 30 min.)

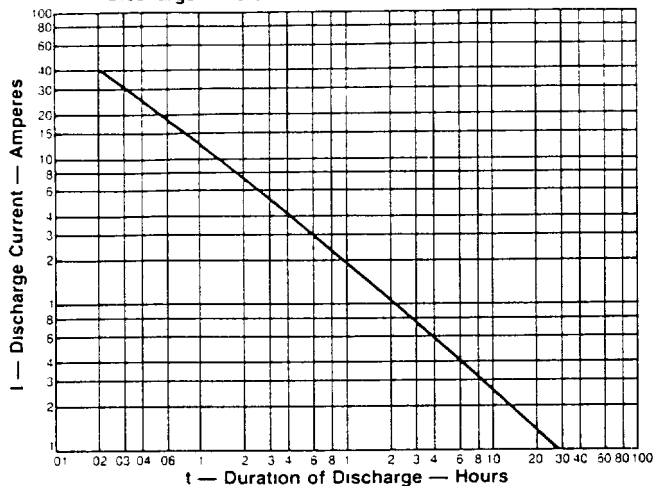
More cycles are available with shallower discharges

\*\*\*Based on accelerated test methods, 2.35 volts constant voltage charge at 23°C ambient temperature

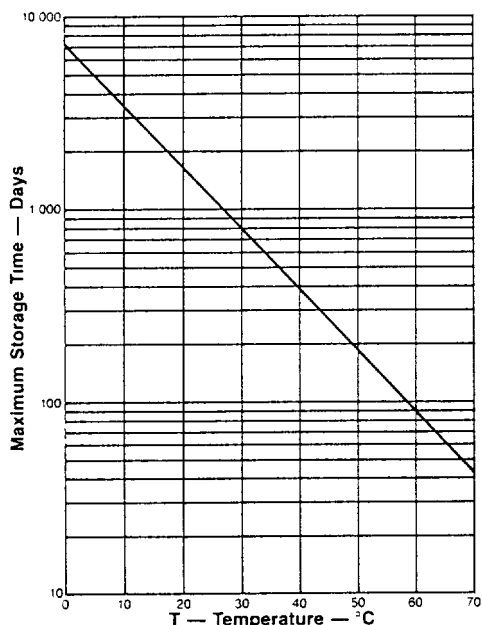


**2V, 2.5Ah  
sealed  
rechargeable  
"D" cell**

Discharge Time of D-Cell at Various Currents at 23°C

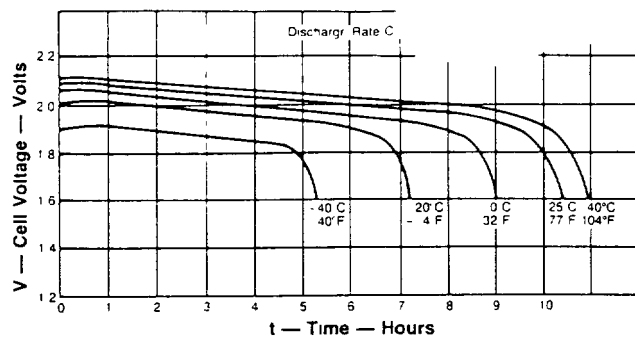


**Discharge Characteristics.** Based on data from standard production, 90% of all cells produced by GEP meet or exceed these discharge characteristics. New cells must be cycled or floated appropriately before full rated capacity, as shown on this curve, is reached.

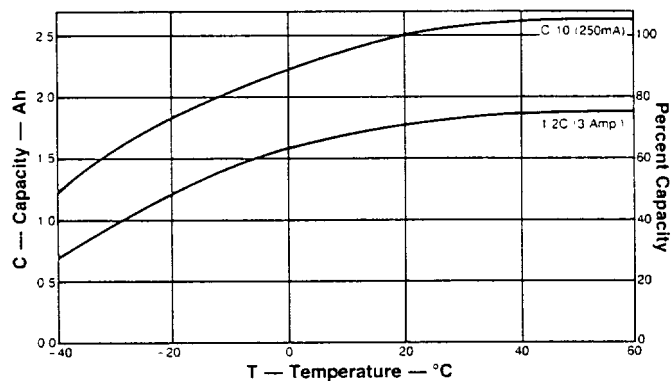


**Storage Characteristics.** The storage time is very dependent on the storage temperature as shown in this maximum allowable storage time versus temperature curve for a charged cell.

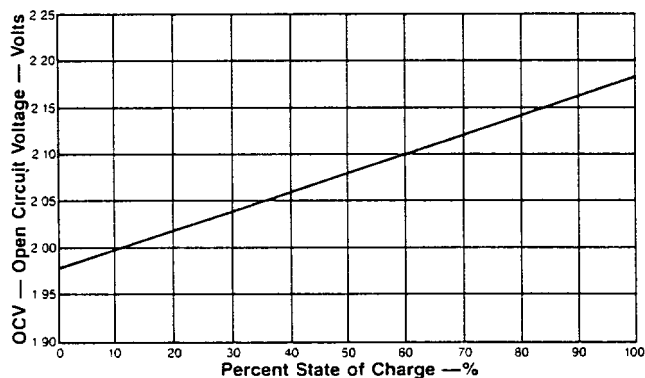
Leaving the Gates Energy Cell connected to a load for a long period of time after it has been discharged may cause difficulties in recharging and/or reduce cell life. The cell should be put on open circuit or recharged soon after the discharge is completed.



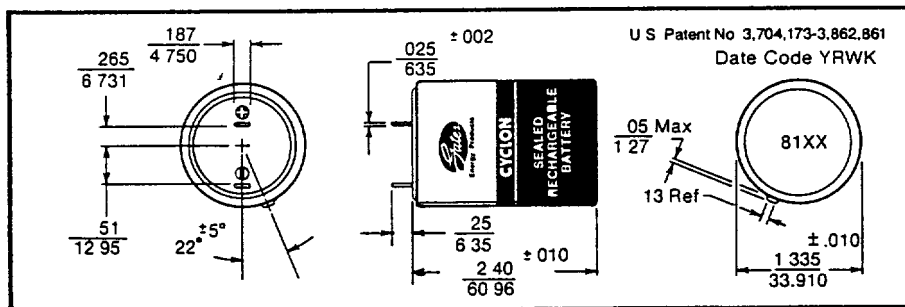
**Voltage Regulation.** The voltage regulation of the Gates cell is equal to or better than any other commercially available system.



**Temperature Characteristics.** The graph illustrates the capacity available in the cell as a function of temperature at two different discharge rates.



**State of Charge.** This curve of OCV vs state of charge is accurate within 20% of the rated capacity of the cell being measured if it has not been charged or discharged within the past 24 hours. The accuracy increases to 5% if the cell has not been charged or discharged within the past 5 days.



Length — 2.650 in/67.31 mm  
Width (DIA) — 1.335 in/33.91 mm  
Weight — 6.4 oz./182 gm  
Tabs — 0.187 x .025

Tolerance (unless noted)  
.XX ± .010 .XXX ± .005

All dimensions =  $\frac{\text{inches}}{\text{millimeters}}$

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**Section V — Reactivity Data**

Stability	Unstable		Conditions to Avoid
	Stable	X	Avoid Shorting. Use only approved charging methods.

Incompatibility (Materials to Avoid)

Hazardous Decomposition or Byproducts

Hazardous Polymerization	May Occur		Conditions to Avoid
	Will Not Occur	X	Do not puncture battery case.

**Section VI — Health Hazard Data**

Route(s) of Entry:	Inhalation?	Skin?	Ingestion?
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Health Hazards (Acute and Chronic)

Not applicable for finished product used in normal conditions.

Carcinogenicity:	NTP?	IARC Monographs?	OSHA Regulated?
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Signs and Symptoms of Exposure

Medical Conditions  
Generally Aggravated by Exposure

Emergency and First Aid Procedures

Battery contains acid electrolyte. If battery case is punctured, completely flush any released material from skin or eyes with water.

**Section VII — Precautions for Safe Handling and Use**

Steps to Be Taken in Case Material Is Released or Spilled

Avoid contact with acid materials. Use soda ash or lime to neutralize. Flush with large amounts of water.

Waste Disposal Method

Place in acid resistant containers. Dispose in accordance with Federal, State and local regulations. Do not incinerate.

Precautions to Be Taken in Handling and Storing

Other Precautions

Read manufacturers literature, which is available upon request.

**Section VIII — Control Measures** Not applicable for finished product.

Respiratory Protection (Specify Type)

Ventilation	Local Exhaust	Special
	Mechanical (General)	Other

Protective Gloves

Eye Protection

Other Protective Clothing or Equipment

Work/Hygienic Practices