

#### 1. Where can I use an L91?

The L91 is a 1.5V cell and can be used in any device that takes alkaline AA's. The best applications for the L91 are higher drain devices such as CD players and cameras

#### 2. Are Lithium batteries safe?

Lithium batteries are rigorously tested against a wide variety of abuse scenarios, including battery reversal, forced discharge, charging, direct short, crush, impact, shock, vibration, dip in water and high temperature storage. The products meet strict acceptance requirements to ensure the safest product for consumers.

#### 3. Why is mixing batteries a problem?

Mixing batteries of different chemistries (lithium and alkaline) in a device causes an imbalance in capacities. As the weakest battery becomes exhausted, it will be force discharged by the stronger batteries. Alkaline batteries that are forced discharged by lithium cells have an increased possibility of leaking. This same problem can occur when mixing fresh and used batteries in a device.

## 4. Is it bad to carry batteries loose in a purse or pockets?

Batteries can be short-circuited by metal items such as coins, keys, paperclips etc. A battery that is subjected to a short circuit can become very hot. A lithium battery will not become as hot as an alkaline cell due to the thermal switch inside, which limits the current



#### 5. Can batteries be recharged?

Only batteries that are labeled as rechargeable should be placed in a charger. Attempting to recharge batteries not designed for this purpose greatly increases the potential of leakage

#### 6. How long will my batteries last?

There are several factors that impact the length of service that batteries will provide. The most important aspect is the rate at which the device consumes power. A very high drain device like a digital camera will deplete a battery much quicker than a low drain device like a clock. Other factors affecting performance include the battery chemistry, temperature conditions and usage patterns (continuous or intermittent).

#### 7. How is the capacity of a battery determined?

The capacity of a battery is typically expressed in milli-Amp hours (mAh) when the batteries are discharged at a specific current drain (i.e. 25mA) to a cutoff voltage (i.e. 0.8 volts). The time (hours) it takes the battery to reach the cutoff voltage is then multiplied by the current drain to establish the mAh capacity of the battery.

### 8. Does the mAh capacity of a battery change with the drain rate?

A battery is much more efficient at using its fuel at lower current drain. Therefore, the mAh capacity of a battery will drop somewhat at high drain rates.



#### 9. How long can I store batteries?

When stored at room temperature (ie 70°F/ 21°C, Lithium batteries have a shelf life of 10-15 years. Storing the batteries at higher temperatures, shortens the shelf life.

#### 10. How can I test batteries to see if they're still good?

A battery tester (loaded voltmeter) is a simple and effective way to determine if a battery is good or bad. Most battery testers place an appropriate load on the batteries and then reads the voltage. A voltmeter without a load can give very misleading information and is not recommended for this purpose.

#### 11. Is there a guarantee on Energizer batteries?

Our guarantee states: "We will repair or replace, at our option, any device damaged by this battery if it is sent with batteries to Eveready. Guarantee void if user or device recharges battery."

## **12.** Where can I obtain information on the effects of swallowing a battery?

The national poison control number is 202-625-3333 (call collect). This is a 24-hour service that is partially funded by the battery industry.

#### 13. Are lithium batteries considered hazardous waste?

No, Energizer lithium batteries are classified as common household waste. Great strides have been made in making batteries more environmentally friendly by eliminating added mercury and switching away from rechargeable batteries containing cadmium.



#### 14. Do lithium batteries leak?

Lithium batteries do not leak as alkaline batteries do. Batteries that have seen extreme abuse scenarios may vent and discolor the top cap of the cell giving the appearance of leakage. This condition is rare and will not occur under normal use or misuse conditions.

## **15.** Can lithium batteries be charged in an Energizer charger?

No. Energizer lithium batteries are not designed to be recharged.

#### 16. Why are lithium batteries more expensive than alkaline?

Lithium batteries cost much more to produce than an alkaline battery due to raw material costs and battery construction. However, the performance of the lithium batteries often greatly exceeds that of alkaline cells. In high drain applications like a digital camera applications, the cost per capacity delivered can actually be lower than an alkaline cell

#### 17. What is a normal open circuit voltage for an L91?

The normal open circuit voltage for an L91 is higher than that of alkaline and ranges from 1.75-1.8V. This should not pose a problem in devices since the voltage drops once the battery is under load.

#### **18. Will the higher open circuit voltage damage my device?**

No. Numerous devices have been tested and third-party device engineers have certified that the higher open circuit voltage of the L91 is not an issue in devices.



#### 19. Why do Li batteries work better at cold temperatures?

Lithium batteries use an organic electrolyte that is not as affected at low temperatures as the aqueous electrolytes used by alkaline cells.

## **20.** Since lithium batteries are so much lighter than alkaline, do they have less input?

No, the active materials in lithium batteries are less dense than those used in alkaline cells.

# 21. If the capacity on the datasheets is so similar between alkaline and lithium, why does the L91 last longer?

Capacities on the datasheets are based on very low drain rates which are highly dependent on the amount of active material in the cell. As drain rates increase, efficiency becomes an important factor and the jellyroll construction of the L91 maximizes efficiency

## 22. If lithium batteries are ideal for high drain devices, what should I expect in a low drain device?

In low drain devices, the performance of the L91 is very similar to alkaline and no real performance benefit is observed.

#### 23. Is the L91 UL approved?

No. The L91 has not been submitted for UL approval but is thoroughly internally tested and meets international safety criteria for lithium batteries.



#### 24. Once the PTC is activated, can the battery still operate?

The PTC will temporarily activate when the cell becomes overheated. Once the cell cools down, the battery will operate normally.

## 25. Will the PTC prevent my batteries from working in a device?

The PTC will only activate when the cells get very hot. The PTC may trip after extended continuous use in a high drain application at high temperature. Such conditions are rare. In the event that the PTC does trip during use, allow the cells to rest and cool before restarting the device.