

# New ROAR Lithium Battery Technology

## Rules In Brief

The official ROAR Rulebook language and wording in some cases is purposely very technical in order for them to be as succinct and precise as possible and avoid confusion about the rules. ROAR realizes the new addition of Lithium Polymer batteries to the 2008 ROAR Rulebook is an eagerly anticipated action that has already stirred a great deal of interest from our members and affiliates. ROAR is pleased to present the basic rule set in straightforward language here, so all of you can see and understand the areas pertaining to our racing membership.

The full Lithium Polymer battery section in the rules [ROAR Website Rule Book Revision 2008](#) contains an amazing amount of informational material about Lipo packs, and all of our members and affiliates are strongly encouraged to read that full section (8.3.2.7) in its entirety. So without further delay, here are the basics of the new ROAR Lipo rules:

### **Physical Specs:**

#### 8.3.2.2.1 Hard Case & Dimensions

A factory encased hard shell pack is mandated for race durability reasons that stem from the vulnerability of Lipo cells to physical damage. Any physical distortion, denting or puncture to the cells will cause either an immediate or long term safety risk. A hard cased pack reduces this risk significantly by protecting the cells from crash damage, battery ejection, and general wear and tear at the track.

The maximum dimensions are:

Length: 139mm +0mm/-3mm

Width: 47mm +0mm/-2mm

Height: 25.1mm +0mm/-3.0mm

These are in place to standardize pack dimensions in order for chassis manufacturers to now be able to design around a consistent set of fixed dimensions.

### **ROAR Lipo Safety Testing:**

#### 8.3.2.3 Drop Test

The Drop Test makes sure the case doesn't shatter or produce sharp pieces of the case that could potentially puncture the cells inside.

#### 8.3.2.4 Overcharge Test

The Overcharge Test simulates a common condition of user error where the pack is being incorrectly charged. The pack is allowed to puff and/or vent, but the pack is not allowed to show open flame at any time during the test procedure. A vast majority of Lipo destructive failures (puffed/vented/burned packs) happen while the pack is on the charger, and a vast majority of them happen because of simple user error in selecting the correct pack voltage to charge at, or charging them with anything other than the correct Lipo battery mode.

Forgetting to set the charger to Lipo mode, and then charging the Lipo pack with NiMH mode is an excellent example of what this test simulates.

### 8.3.2.5 External Short Circuit Test

The External Short Circuit Test basically puts a discharge load on the pack, and then discharges it all the way down to zero volts. The pack is allowed to puff and/or vent, but not allowed to show any open flame for the duration of the test. This test simulates driving a vehicle without using a proper 6v cutoff all the way down to where it won't drive any longer, or a similar case of leaving a Lipo pack plugged into an ESC for an extended period of time which will also drain it all the way down.

### **Usage Rules:**

8.3.2.7.1-3 DISQUALIFICATION will be the result of not following any one of these three charging guidelines:

- 1) Charging Lipo packs with anything but a charger capable of the standard Lipo CC/CV charging method.
- 2) Charging a Lipo pack to any voltage higher than 8.44v
- 3) Charging a lipo pack outside of a "Lipo Sack" or other device proven to contain a destructive failure involving flames with at least a 5000mah 7.4v pack.

ROAR will absolutely not tolerate purposely overcharging Lipo packs, or charging with any device not using the standard CC/CV Lipo charging method. Both will severely damage the pack and therefore create a completely unnecessary safety risk. The use of a "dual layer" of fire protection from the ROAR Lipo testing procedures as well as mandating the use of a proven fire containment device while charging were developed for your safety, as well as the safety of those around you. Widespread Lipo use in a racing environment is still relatively new, and the choice was purposely made to err on the side of caution here.

### 8.3.2.7.4: Basic Lipo usage guidelines

These are the basic guidelines for proper care and feeding of a Lipo pack. ROAR has chosen to write these directly into the *2008 rulebook* in the interest of completely and accurately educating the racing community about this technology. Please read them in their entirety and understand them completely even if you are already using Lipo packs. When these guidelines are understood and followed, Lipo batteries not only pose no more safety threat than any other battery type, but will provide each user with hundreds of consistent cycles.

### 8.3.2.7.5: Understanding Pack Failures

Continuing the process of understanding the technology here with exactly what causes destructive failures in Lipo packs. In order to know how to avoid them, ROAR presents exactly the situations, parameters, and root causes of pack failures. Again, please read this section in its entirety for the full benefit of this valuable information.

***ROAR believes the first and most effective step towards Lipo safety is an informed and fully educated user.*** Please take the time to fully read through these informational sections whether you intend to run these packs or not. The sooner we as the racing community in our entirety are completely informed, the safer we'll all be.