

IDX Batteries vs. Low Cost Offshore Batteries

Our Concern:

Many battery accidents and complaints related to low cost offshore manufacturers have been reported in recent years. IDX investigated the reason for these claims. The following report is our findings, and a comparison with IDX batteries. The study is based on products from four low cost offshore battery companies.

Reported Problems:

- Short battery life span & battery operation failures
- Damages to the equipment circuit board (i.e., LCD monitor)
- Damages to the camera exterior by a battery thermal event

Our Comparison Categories:

- Quality of the Battery cells used in the off shore batteries
- Quality of the Battery production processes used

How Do Battery Cells Affect Battery Quality?

Type of Cells:

- Capacity [voltage & current (amperage) draw]
- Electrical load which can be imposed on the battery
- Performance under temperature extremes
- Number of Life Cycles the battery can withstand

Cell Lot:

- Age of the Cells
- Cell Balance (Cells ability to work together)

Cell Balance:

- Good Balance Among all Cells = Good Life Cycle
- Bad Balance = Faster Cell Deterioration = Shorter Life Cycle

Battery Cells Used by Offshore Battery Manufacturers:

- Cells are from different cell lots, results in poor cell balance, poor life cycle performance
- Using old Cells (no longer in production) - Poor performance
- Cells with low temperature performance are used
- Using recycled cells & damaged cells - Poor performance, Poor life cycle, & possibility of an accident (e.g., thermal event)

Fig A1 – Adhesive residue remaining on the cells from prior usage.

Fig A2 – Shrink wrap is damaged. Poor treatment of cells which may lead to a short circuit.



Fig A1

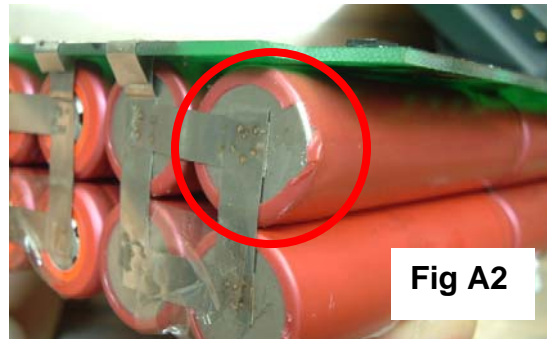


Fig A2

Battery Cells Used in IDX Batteries:

- **Balanced Cells**
 - ✓ Voltage levels are matched
 - ✓ Impedance levels are matched
- **Carefully studied and selected cells**
 - ✓ Capacity
 - ✓ Life Cycles
 - ✓ Electrical load
 - ✓ Safety
 - ✓ User conditions
 - ✓ Temperature tolerance
 - ✓ Cost
- Cells are properly grouped and assembled in a balanced manner.

A Cell Comparison:

	Balanced Cells	Cells w/ Correct Specs	Use New Cells
Offshore Manufacturers	NO	NO	Mostly\not all
IDX	YES	YES	YES

How Does Production Quality Affect A Battery?

- Proper Design: Assures reliable operation and safety
- Casing: Protects cells and the circuit board
- Controlled Soldering: Current flow, operation, and safety
- Cell Tab Connection: Current flow, operation, and safety
- Cell Insulation Spacers: Prevents short circuits
- Basic Assembly: Quality of the overall product = Reliability

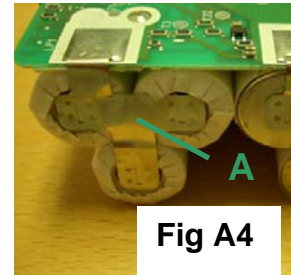
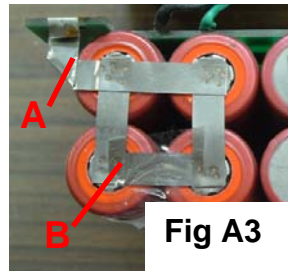
A Production Comparison:

	Offshore Manufacturers	IDX
Operation Circuit Design	Questionable	Reliable
Protection Circuit Design	Questionable	Reliable
Casing Design	Not UL Standard	UL Standard
Cell Tab Design	Ignored	Specifically designed
Soldering Technique	Questionable (by hand)	Reliable (by machine)
Cell Insulation Spacers	Randomly Used & Poor Quality	Always Used & High Quality
Assembly Technique	Low Skill Level	High Skill Level
Quality Control	Low & Questionable	Strict

Fig A3-A – Offshore battery: Cell tabs are folded to fit their design. This increases the resistance to the current and can lead to heat or thermal accidents.

Fig A3-B – Offshore battery: Cell tabs are layered which can lead to an increase in resistance and contact failures.

Fig A4-A – IDX battery: Cell tabs are specifically designed as 1 solid piece for maximum efficiency.



Comparison Results:

➤ Quality of Cells

- ✓ Most low cost offshore manufacturers used substandard and poorly balanced battery cells in their battery packs. One company was using recycled/used cells in their pack and another company was using cells that were discontinued a few years ago (old cells). This points out their cost reduction efforts by using questionable battery cells in their products, which leads to substandard battery performance and poor life cycles.
- ✓ IDX only uses new battery cells in our battery packs. All cells are checked for voltage & impedance level and grouped together for maximum cell balance. Once the cells are grouped, they are packed in a timely manner to ensure freshness of the battery pack.

➤ Quality of Production

- ✓ Low cost offshore manufacturers demonstrated many cost reduction techniques and fail to meet safety and reliability as a product. This substandard quality level is believed to be the leading cause of accidents and damage resulting from these offshore products.
- ✓ IDX batteries are assembled from specifically designed components, from the circuit board through to the cell tabs. Each component is designed for safety, reliability and efficiency. All the components are assembled to a strict standard to ensure product safety and reliability.