

MOTOROLA ORIGINAL BATTERIES

**PROVEN
TOUGH**



***Battery Durability Test Results:
Motorola beats the competition***

Built to meet high standards

Tested for toughness

Performs when others fail

MOTOROLA ORIGINAL BATTERIES

PROVEN TOUGH

Tough Job. Tougher Battery.

Vibration. Impact. Static.

Shove it in your tool belt. Bounce it on your cab seat. Expose it to static. Drop it on the ground. Whether you're on-the-job lifting, chasing, or drilling, your daily work-life needs a two-way radio battery you can depend on.

Shopping for batteries? Test results confirm we beat the other guys.

Against Motorola Original batteries, the other batteries failed to work after lab tests repeated typical job-site-type challenges.

Drop Test

**“ 88% of the
Motorola
batteries
passed. ”**

Vibration Test

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ESD Test

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Motorola batteries built tough

Motorola two-way radio batteries are tough – many years of experience have taught us how to make them that way. From design and manufacturing through real world experience, we build Motorola two-way radio batteries to the highest possible standards of quality and consistency – so you can be sure the Motorola two-way radio batteries you buy will stand up to and survive real-world hazards and rigorous daily use. The tests described in this brochure are the proof.

Built tough from the ground up

A tough battery doesn't happen by accident. Motorola starts with the cells – the critical components that provide the power – to build tough batteries from the inside out. We sort through the cells our suppliers produce to identify those of highest quality.

The cells we choose for Motorola two-way radio batteries provide:

- High capacity
- Long cycle life
- Low impedance
- Wide temperature range
- Best shock resistance

All these characteristics are essential to keep your radio working within its optimum specifications for transmission and reception sensitivity as long as possible during the battery's life cycle.

Battery Construction Features

Durable
Polycarbonate
Housing

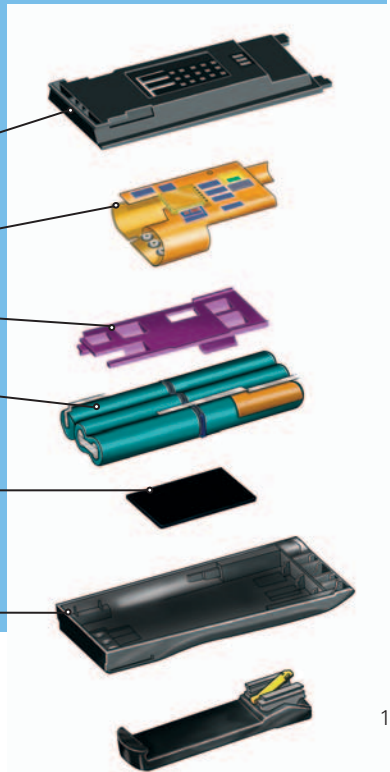
Soft Copper Flex
Circuitry

Cell Spacer

Premium Cells

Shock Absorbing
Padding

Durable
Polycarbonate
Housing



We're in control to keep you in touch

We engineer each Motorola battery to provide optimum performance with specific Motorola radios and accessories. And we control the manufacturing process to assure superb quality over time: ISO 9000 certification and a high level of automation in the industry lead to consistent high quality, with less human error. So you get clear, reliable communication under tough conditions – something you can't be sure of with a competitor's battery. The test results in this pamphlet prove our superb durability.

Accelerated Life Testing and System Testing

Motorola has a firm commitment to quality and reliability. Before we put the Motorola name on any battery, we put it through Accelerated Life Testing (ALT) – a process of rigorous laboratory testing that simulates years of field use. Each new product is dropped, shaken, zapped and more – undergoing as much torture as even your toughest working conditions could provide.

To minimize costly repairs and downtime for you, we design, manufacture and test our radios to reach high levels of component and workmanship quality.

We don't just test the battery by itself, but also as part of a working system. Every battery is tested with all compatible radios and accessories. In many cases, this means conducting thousands of tests to capture every combination possible. This thorough testing is done to help ensure impedance in your radio system is minimized and that you have dependable power when you need it.

Only when it passes those tests do we begin to produce and sell it.

Here are just a few of the tests each Motorola two-way radio battery must pass:

Rain: Steady rainfall and wind for 30 minutes on every surface. Important for agriculture, construction, utility and public administration personnel who must work outdoors in any kind of weather.

Salt Fog: Exposure to an atomized salt solution for 48 hours. Hospitality staff, utility workers and public administration personnel working near oceans or around winter salt applications require resistance to salt corrosion.

Dust: Six hours of blowing dust on all surfaces. Critical for agriculture, construction, utility and public administration workers who are exposed to a variety of dusty environments.

Vibration: Up to nine hours of exposure to vibration that simulates the rattling a radio could undergo while being transported. Light construction and industrial workers, agriculture, utility and public administration staff expect a radio in withstand any vibrations.

Shock: Eighteen shocks with a minimum G force of 40 Gs each.

Testing who's toughest

How do you find out if a battery will stand up to real-world stresses? How do you find out if one brand of battery will continue to perform when others won't? How do you find out which battery will cost you less over time?

Meeting our own standards – even the tough ones in our Accelerated Life Testing program – isn't enough. At Motorola, we want the batteries you purchase to be the best you can possibly buy. This means testing our batteries against governmental and industry standards, and against the competition.



So we hired an independent, outside service to collect batteries made by several of our competitors – batteries compatible with the most popular two-way radio model families. They collected 30 samples of each battery type:

Compatible w/ Radio Models	Motorola	Multiplier	Battery Zone	Honeywell	Power Products
HT1000 JT1000 MTX8000 MTX9000	NTN7144	M7144	BZ7144	GTS7144C	BP7144
XTS3000 XTS3500 XTS5000	RNN4006	M8923HX	BZ4006		
HT750 HT1250 HT1550 MTX850 MTX8250 MTX950 MTX9250	HNN9008	M9009	BZ9008	GTS9008M	BP9008
CP150 CP200 PR400	NNTN4496				BP4496
Total Samples	120 batteries	90 batteries	90 batteries	60 batteries	90 batteries

 No comparable product available

While the ALT program includes many tough tests, we chose three that represent events that occur most often in normal battery use:

- Being dropped on a hard surface – Drop Test
- Being subjected to long periods of vibration – Vibration Test
- Being shocked by static electricity – Electrostatic Discharge (ESD) Test

Then experienced technicians compared the performance of Motorola two-way radio batteries against the performance of the competitors’ batteries in those tests.

We used 10 samples of each manufacturer’s battery in each test.

Drop Test

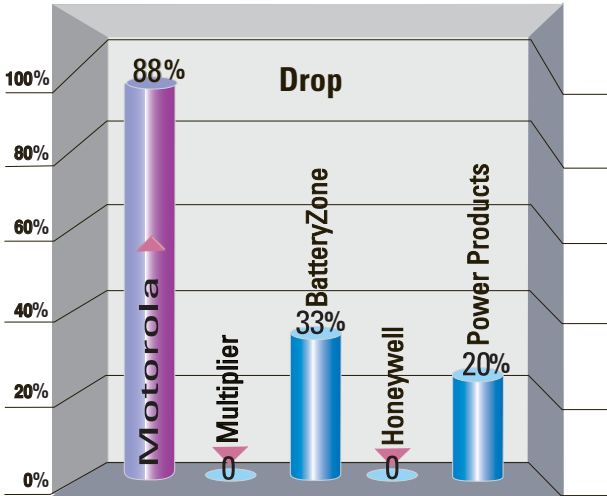


Method: The drop test was set up according to specifications issued by the U.S. military for its own equipment (MIL810F Method 516.4). Technicians attached each battery to the appropriate Motorola radio and dropped it four feet to a smooth, metal surface. Each individual battery went through seven test cycles. Each cycle consisted of six drops, for a total of 42 impacts. A cycle consists of:

- 1 drop on the front
- 1 drop on the back
- 1 drop on the left side
- 1 drop on the right side
- 1 drop on the top
- 1 drop on the bottom

The technicians inspected each battery for damage after every cycle of drops, for:

- Cracking or splitting open
- Damage to the connection with the radio
- Inability to charge
- Inability to discharge



Results: 88% of the Motorola batteries passed. If you're a CP150/200 user, consider that the NNTN4496 battery passed 100% of drop test where Power Products BP4496 batteries all failed.

Multiplier: None of the Multiplier batteries survived – half of them failed in the first cycle.

Battery Zone: Only 33% passed.

Honeywell: None passed – all the samples of the Honeywell batteries failed.

Power Products: Only 20% passed – all 10 samples of two of the Power Products battery types failed.

Typical failures included splitting of the battery housing, broken latches, being dislodged from the radio and failure to charge.

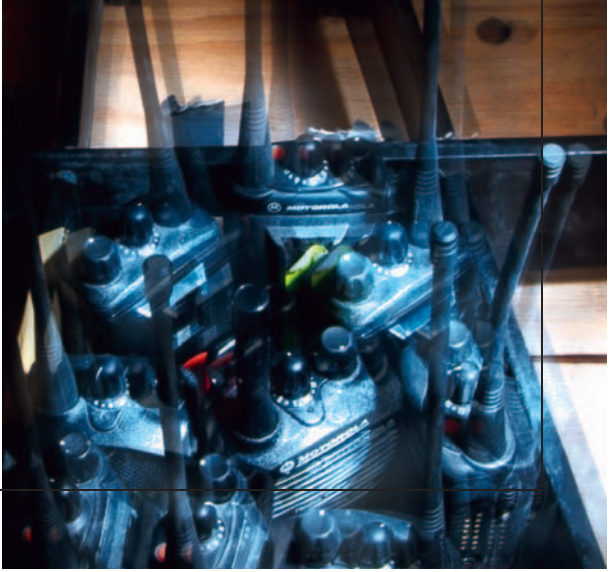


Multiplier M8923HX Battery Drop Test Failure, Splitting along right side

***“Results:
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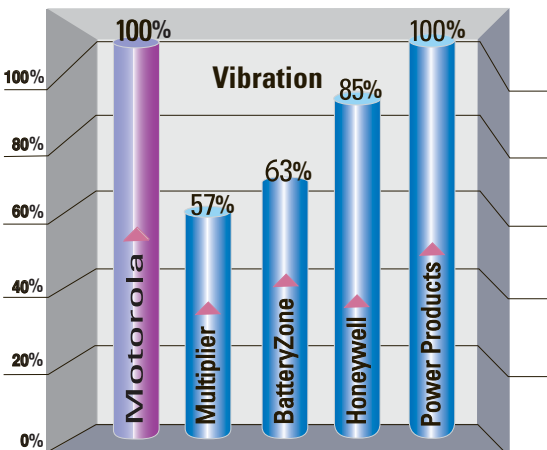
Vibration Test

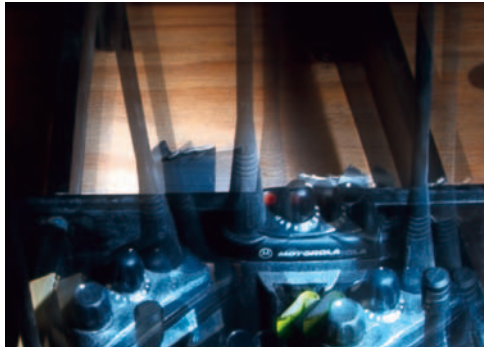


Method: The vibration test, like the drop test, followed specifications developed by the military (MIL810F Method 514.5, Procedure 1, Category 24, figure 514C-18 and figure 514C-17). Again, the batteries were attached to appropriate radios, but this time the radios were fastened to metal plates and then vibrated in two different ways:

Sine vibration, which follows a regular, repeating pattern

- 3 hours along the vertical axis (up and down)
- 3 hours along a horizontal axis (back and forth)
- 3 hours along the perpendicular horizontal axis (side to side)





Horizontal Vibration

3 Axes of Vibration



Random vibration, which follows no predictable pattern

- 1 hour along the vertical axis (up and down)
- 1 hour along a horizontal axis (back and forth)
- 1 hour along the perpendicular horizontal axis (side to side)

Each radio went through a total of 12 hours of vibration.

This time, the batteries were inspected once after each axis of vibration, for a total of six inspections:

- Cracking or splitting open
- Damage to the connection with the radio
- Inability to charge
- Inability to discharge

Results: One hundred percent of the Motorola batteries passed. In

this case, consider the Motorola HNN9008 batteries, compatible with HT750, HT1250 and HT1550 radios – all of them passed the test; none of the Multiplier M9009 batteries survived.

Multiplier: Only 53% passed – all 10 samples of one Multiplier battery type failed.

Battery Zone: Only 57% passed.

Honeywell: Only 67% passed.

Power Products: All the Power Products batteries passed.

Broken latches and failure to provide power were the major causes of failure.

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Honeywell H9013 Vibration Test Failure,
Latches Damaged



Electrostatic Discharge Test



Method: This test followed standards set by the International Electrotechnical Commission. There were two parts:

Air discharge (probe is close to battery but not touching)

- Positive 4KV, 8KV, 10KV, 12KV, 15KV
- Negative 4KV, 8KV, 10KV, 12KV, 15KV

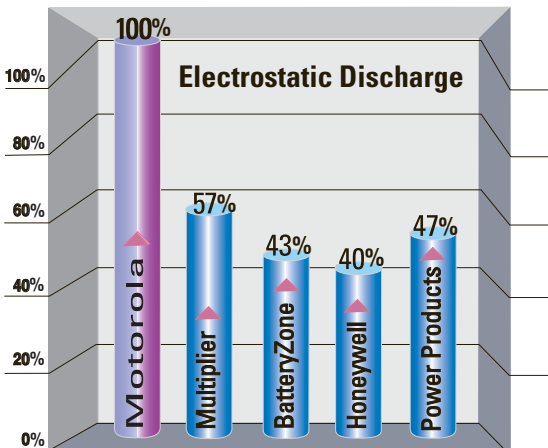
Contact discharge

(probe touches battery)

- Positive 4KV, 6KV, 8KV
- Negative 4KV, 6KV, 8KV

Every battery went through each combination of contact, power level and polarity 10 times, for a total of 200 air discharges and 60 contact discharges.

After each set of 10 discharges, the technicians inspected the batteries for their ability to charge and to discharge.



**“Results:
100% of the
Motorola
samples
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Results: One hundred percent of the Motorola samples passed. Let's look at the Motorola NTN7144 battery, compatible with HT1000, JT1000, MTX8000 and MTX9000 radios – like all the Motorola batteries, it passed this test; but nine out of 10 of the Honeywell GTS7144C batteries failed.

Multiplier: Only 57% passed – nine out of 10 samples of one Multiplier battery type failed.

Battery Zone: Only 43% passed – all 10 of one Battery Zone battery type failed.

Honeywell: Only 40% passed – nine out of 10 of one Honeywell battery type failed.

Power Products: Only 47% passed – nine out of 10 of one Power Products battery type failed.

Typical failures included inability to charge, thermistor problems and flashing LEDs.



Tested tough in the lab, for tough jobs in the real world

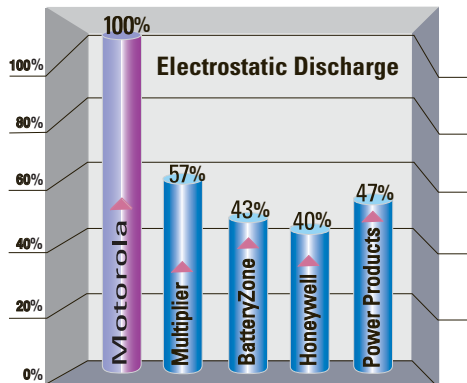
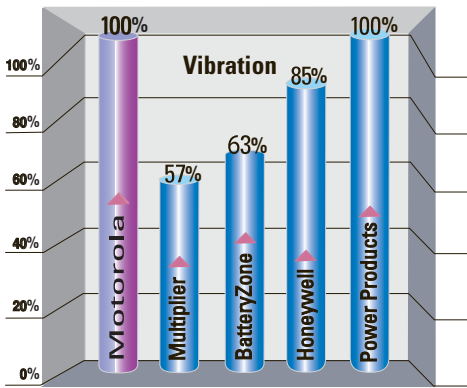
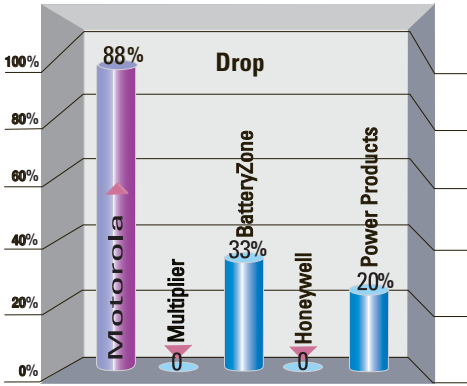
Count on Proven Tough Motorola batteries in critical situations:

- **Public Safety:** When the public relies on you to protect their lives, their families and their homes, there's no margin for error – you must always be prepared, whether you're putting out a fire, transporting accident victims or responding to natural disasters.
- **Large Businesses:** Reliable communication is essential to your bottom line – keeping your personnel in constant contact in business units as diverse as production, distribution and customer service.
- **Municipalities:** Keeping our home towns safe, healthy and pleasant places to live isn't as easy as it may seem – your responsibilities include not just responsive service, but efficient workflow and economical operation as well.
- **Small Businesses:** Keeping your customers happy is your number one job – making sure orders are delivered accurately or crews arrive at job sites on time means your business stays productive and profitable.

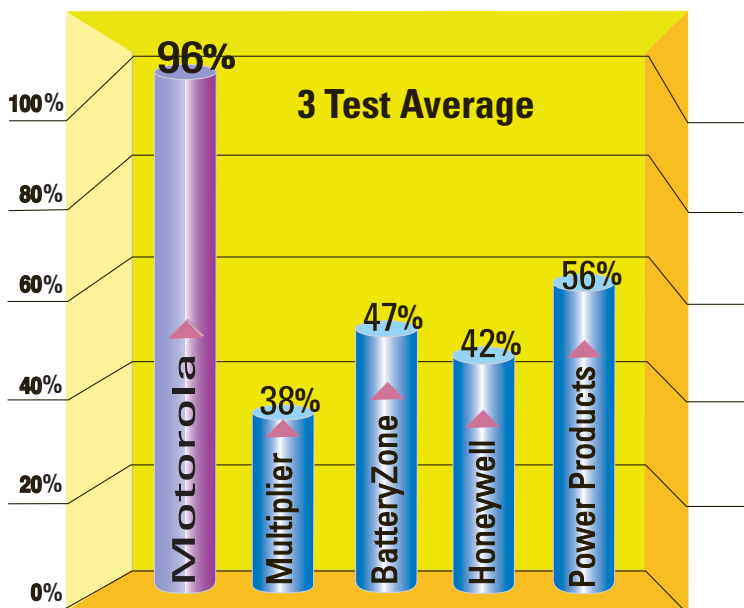
Passing the value test

Lives and livelihoods depend on the toughness of your two-way radio batteries. Can you afford to buy “cheap” batteries that could fail just when you need them most? Can you afford to replace those batteries every time they fail – when you know there’s a better choice?

Beyond the physical tests in the ALT program, Motorola batteries pass two even tougher challenges: Keeping you in instant contact in critical situations... and keeping your costs under control.



*Drop, vibration and ESD tests prove it –
Motorola is consistently tougher than competition.*



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