

Integrated Electrode Fold/Roll & Light Inspection Tester

▶ FZT Series



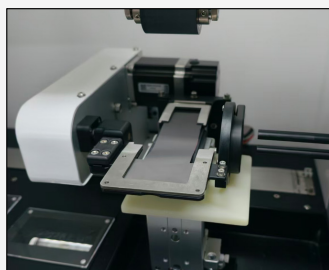
Background and Significance

As the lithium-ion battery industry moves toward higher energy density, electrode fold-and-light-transmission inspection has become an essential upstream quality-control step and a critical measure for controlling electrode brittleness and mitigating safety risks. Traditional manual inspection suffers from inconsistent parameters, large measurement errors, low efficiency, and a lack of quantitative data. By replacing manual inspection with standardized folding-rolling and quantitative visual inspection, this system delivers accurate, consistent, and fully traceable test results. It supports the upgrade of upstream QC automation in lithium-battery manufacturing, thereby reducing costs, improving efficiency, and ensuring battery quality at the source.

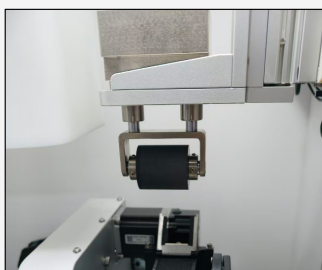


Innovative Solution

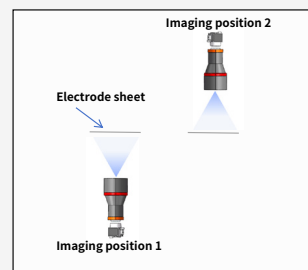
The FZT1000 is designed in line with standard upstream inspection specifications in the lithium-ion battery industry. It combines precisely controlled mechanical folding with constant-pressure rolling to simulate production conditions, subjecting coated electrode sheets to folding-rolling treatment at a defined angle and pressure. After the electrode sheet is unfolded, a high-resolution vision imaging system captures images of the fold-crease area. Proprietary image-processing algorithms automatically identify and quantitatively analyze light-transmission points at the crease, accurately determining their number, area, and dimensions. The resulting quantitative data can be used to evaluate coating brittleness, adhesion, and the suitability of the electrode calendaring process, replacing traditional subjective visual inspection.



Folding mechanism

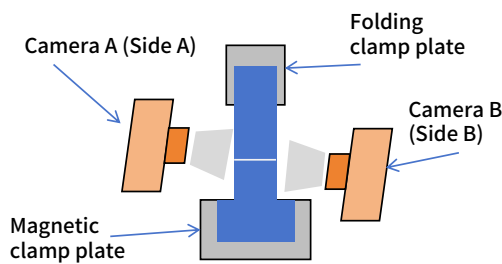


Rolling wheel



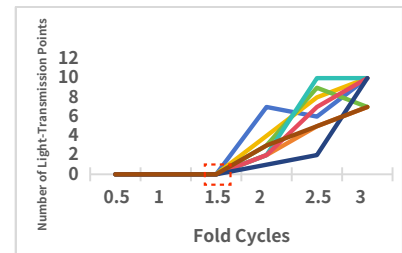
A/B-Side Bidirectional

Analysis Method



The electrode sample is placed in the folding mechanism for folding. A high-resolution vision imaging system captures images of the fold-crease area from the front and back, and records crease dimensions, area, and number of light-transmission points.

Cathode Electrode Fold-Light-Transmission Performance



Relationship between fold cycles and the number of light-transmission points for eight cathode electrode sheet samples.

Upgraded Technical Features

Dual-camera inspection

Cameras on both the front and back side detect the light-transmission level of the electrode sheet, avoiding measurement distortion caused by powder contamination on one side.

Two test modes

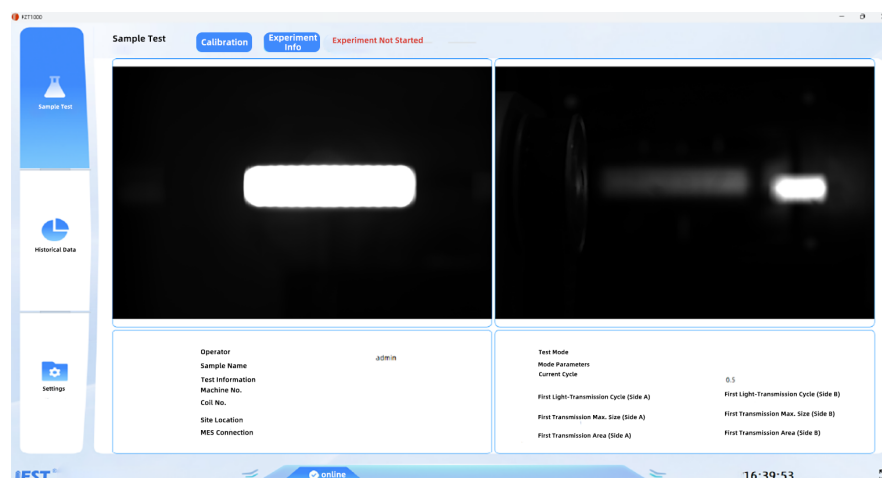
Cycle Mode: Evaluates the electrode's light-transmission performance after a preset number of fold cycles.

Transmission Mode: Continuously folds the electrode until the fold-crease light-transmission area reaches a preset size, thereby determining the electrode's brittleness limit.

Software Interface

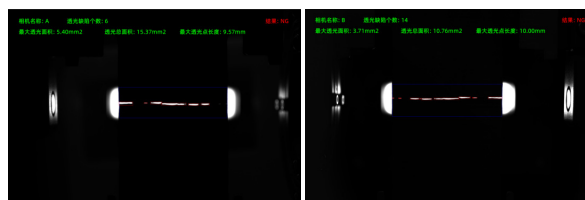
Multi-Functional Software

- Displays the size, area, and count of light-transmission points in real time.
- Provides two configurable modes for evaluating electrode brittleness:
 - Cycle Mode: Set the number of fold cycles.
 - Transmission Mode: Set a light-transmission area threshold; the cycle at which the measured area exceeds the threshold is recorded as the transmission cycle.
- Allows users to retrieve and view historical test data.

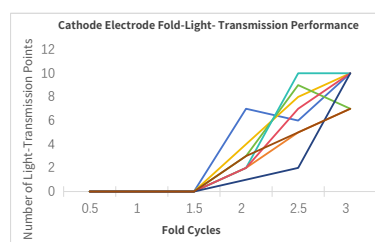


Application Case

Cathode electrode sheets from the same product and the same jelly roll were tested to evaluate their folding brittleness. The results are shown below.



Light-transmission defect images at the fold captured by the Side A/B cameras



The results show that the cathode electrode sheets from the same jelly roll exhibited an initial light-transmission cycle of 1.5, demonstrating the high consistency of the testing equipment.

Specifications

Model	FZT1000
Sample Thickness Range	60~200μm
Sample Size	Head: 35mm*65mm; Tail: 15mm*40mm
Samples per Test	1 piece
Fold Angle	Forward Fold: 175°; Reverse Fold: 170°
Fold Angle Accuracy	0.1°
Vision Accuracy	10μm
Test Time	25-40S
Sampling Rate	4 times/cycle
Equipment Dimensions	760mm*1300mm*630mm

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