

Taber Abrasion Testing

Polyfuze® Polymer Fusion Label Technology

Evaluating Surface Durability With and Without Nano-Shield™

Test Objective

This abrasion resistance evaluation was conducted to compare the surface durability of Polyfuze® Polymer Fusion Labels, standard vs. Nano-Shield™ enhanced, using Taber Rotary Abrasion methodology per ASTM D4060.

The purpose of this test was to measure surface material wear under mechanical friction. Two samples were tested:

- Sample 134a – Standard Polyfuze label
- Sample 134b – Polyfuze label with Nano-Shield™ surface enhancement

Both were fused to polyolefin-based plaques and tested using CS-10 wheels under a 1,000g load for up to 2,000 cycles.

Why This Test Matters

Abrasion resistance is commonly viewed as a measure of label toughness. However, high abrasion scores don't guarantee real-world durability, especially on polyolefin plastics like HDPE or PP.

Traditional label technologies often apply hard surface coatings that test well in labs, but these fail in the field due to poor adhesion or edge lift. Polyfuze labels are different:

- They molecularly fuse with the plastic, meaning no adhesive layer to separate.
- They maintain integrity even after surface wear, because the label is the plastic.
- Nano-Shield™ further enhances surface abrasion resistance without affecting long-term fusion performance.

Test Methodology

Parameter	Details
Test Standard	ASTM D4060 – Taber Rotary Abrasion
Equipment	Taber Model 5155
Wheels	CS-10 Abrasive Wheels
Load	1,000 grams per wheel
Cycle Count	500–2,000 cycles (measured in 500s)
Vacuum Nozzle	1/8" gap
Test Conditions	71°F / 55% Relative Humidity
Operator	Taber Industries – Cliff Fee
Substrate	Polyolefin plaque (center-drilled)

Taber Abrasion Testing

Polyfuze® Polymer Fusion Label Technology

Evaluating Surface Durability With and Without Nano-Shield™

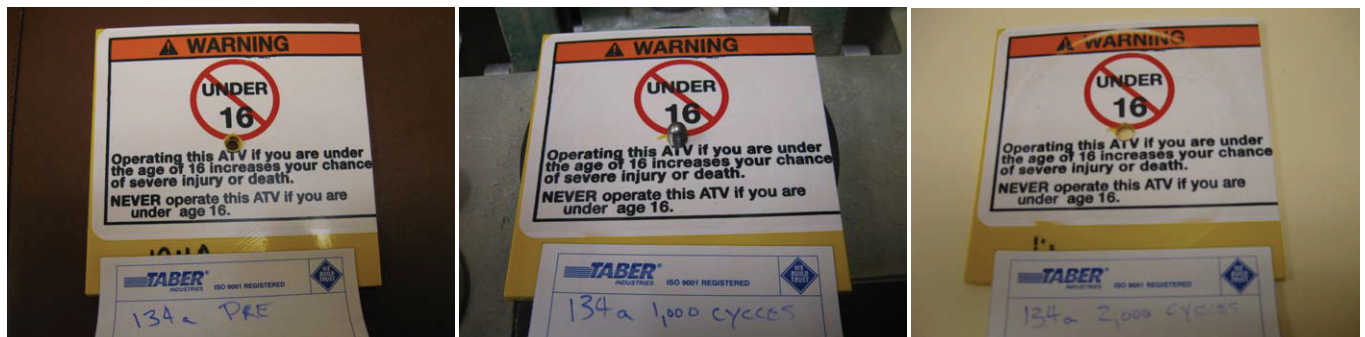
Test Results

Sample	Description	Total Weight Loss (g)	Visual Notes
134a	Standard Polyfuze Label	0.0329g	Slight breakthrough at top by 2,000 cycles
134b	Polyfuze + Nano-Shield™	0.0348g	No breakthrough observed

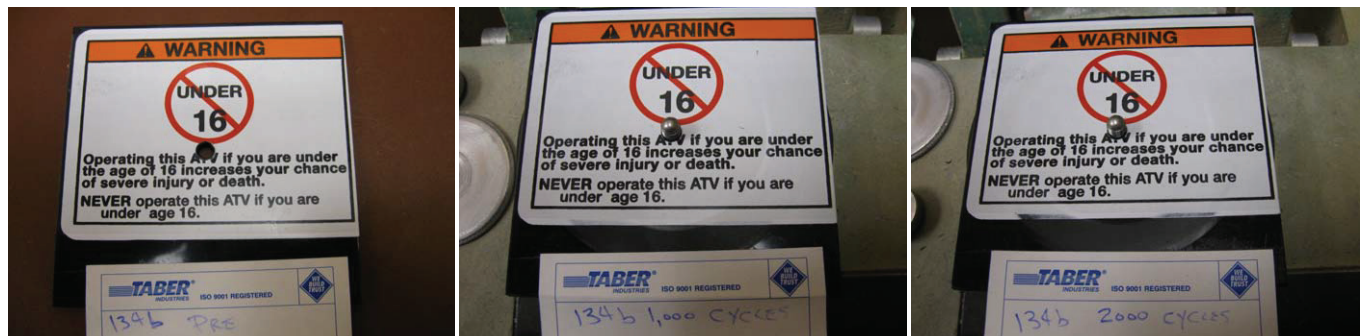
Both labels demonstrated strong abrasion resistance after 2,000 cycles.

Nano-Shield™ provided improved surface retention without any structural failure or separation from the polyolefin substrate.

Visual Performance



Sample 134a (standard label) at 0, 1000, and 2000 cycles. Shows minor wear at 2,000 cycles.



Sample 134b (Nano-Shield™) at 0, 1000, and 2000 cycles. Shows improved surface retention over standard.

Taber Abrasion Testing

Polyfuze® Polymer Fusion Label Technology

Evaluating Surface Durability With and Without Nano-Shield™

Performance Summary

Polyfuze labels, both standard and Nano-Shield™ enhanced, demonstrated excellent surface durability under repeated abrasion.

- No edge lift, peeling, or delamination occurred
- Surface wear was minimal, and Nano-Shield™ offered enhanced abrasion resistance
- The label remained fused and readable throughout testing

In contrast to traditional label methods, Polyfuze provides abrasion resistance plus permanent fusion, essential for durable goods made from soft, low-energy plastics.