



Technical Data Sheet Polyfuze® Polymer Fusion Label Technology

PET Carrier Release Film

Slightly rough polyester carrier film for suspension of polymer fusion raw material labels as a carrier only. Film is rough-surfaced, hazy or matte, and is not a component within final label assembly post application.

Thickness: 3 mil
Tensile Strength: 22,000 - 27,500 psi.

Fusion Label Construction Thickness

Fusion Label construction: Sole layer of patented Polyfuze® polymer matrix printed onto PET release carrier film. There are no other construction layers (topcoats, face stocks, inks, adhesives, or liners).

*PET release carrier film is used as carrier only and is not included within final label assembly.

Fusion Label: .8 - 1.5 mil.

Applications and use

Polymer Fusion Labels are specifically designed to solve the challenges of labeling **low surface energy polyolefin thermoplastics**, a group of materials known for their resistance to conventional labeling methods. These plastics are critical in industries like Reusable Packaging, **Automotive, Power Equipment, Durable Consumer Goods**, and more. **Polyfuze®** Polymer Fusion Labels are the only labels guaranteed to be **truly permanent** on these substrates.

Polymer Fusion is the process of merging the **polyolefin label** with the **polyolefin component**, creating a single, unified piece of plastic. This is achieved through a precise combination of **melting point, time, and pressure**, without relying on adhesives, tie-layers, bonding agents, or secondary surface treatments. The result is a permanent fusion that cannot be achieved with conventional labels.

- **Fully compatible** with low surface energy polyolefin thermoplastics—no additional materials like substrates or adhesives are required.
- **Specifically engineered** for low surface energy plastics that are difficult to label.
- **Resistant to extreme conditions**, including chemicals, UV exposure, weather, solvents, and temperature extremes.
- **Withstands dirt, oil, grime, and high temperatures**—ideal for demanding industrial environments.
- **Exceeds OEM standards** for permanence and durability, ensuring a longer product lifecycle.

Compliance with Regulatory Requirements

Polyfuze® Polymer Fusion Labeling Technology becomes an inseparable part of polyolefin products after fusion, making the entire product a homogeneous material for compliance. The labels can be formulated to meet various regulations, including FDA (21 CFR 174.5), RoHS, CPSIA, Prop 65, TSCA, and REACH/SVHC. These labels are classified as non-hazardous under OSHA and GHS standards globally.

Customers are responsible for testing finished products to ensure compliance. While Mold In Graphic® Systems / Polyfuze® Graphic Corporation provides Certificates of Analysis (CofA) and Safety Data Sheets (SDS), additional testing by external parties requires a signed Mutual Non-Disclosure Agreement (MNDA). Once fused to a substrate, labels are no longer covered by the MNDA.

For more detailed information on regulatory compliance, customers can request the **MIGS/PGC Regulatory Compliance Declaration** sheet.



Polyfuze® Graphics Corporation
999 W. State Route 89A
Clarkdale, AZ. 86324
Tel: 928.634.8888



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Performance Data

The following performance data demonstrates the durability and permanence of Polyfuze® Polymer Fusion Labels when applied to polyolefin substrates. A control sample, consisting of a blemish-free, fully fused label on an HDPE test plaque, was used as the baseline for all tests. Zero Variation from Baseline results, as defined by ASTM 5B Classification (0% loss), indicate no visible or mechanical changes after testing, with no label transfer observed when tape was applied and removed from the substrate.

All tests were conducted post-fusion with no pre-conditioning or surface treatments to the substrate. After fusion, the samples were subjected to extreme exposures and tested using ASTM D3359 Standard Test Methods for Measuring Fusion and Permanence (Test Method B) to ensure label integrity.

QUV Accelerated Weatherometer:

ASTM D4587-11 - 8h UV @ 70°C (158°F) irradiance 1.0 W/(m²·nm) followed by 4h condensation @ 50°C (122°F), repeated continuously for a total of 5,000+ hours. Testing is representative of Polymer Fusion Labels on HDPE plaques, with extended durability observed on UV-stabilized substrates in other testing.

Surface	Result
HDPE Test Plaque	<i>Zero Variation from Baseline / ASTM D3359-09 5B Classification, 0% loss</i>

Outdoor Weathering:

ASTM G7 Exposure ~ 72,000 Langley's, Florida at 5° south - open backed, 6 month period

Surface	Result
HDPE Test Plaque	<i>Zero Variation from Baseline / ASTM D3359-09 5B Classification, 0% loss</i>

Extreme Temperature Fluctuation Exposure:

ASTM D3359-09 was first conducted to create label exposure points. The test plaque was then exposed to Low Temperature (2 hrs. at -40°C/-40°F), immediately followed by High Temperature (2 hrs. at 77°C/170°F). This cycle was repeated for a total of 120 hours.

Surface	Result
HDPE Test Plaque	<i>Zero Variation from Baseline / ASTM D3359-09 5B Classification, 0% loss</i>

Pressure Wash:

Volvo STD 423-0015. Water at 122 °F sprayed 4 inches from the substrate at approximately 1740psi and 4 gallons /minute. Using a manual power washer wand for 30 seconds sweeping across the sample at a rate of 1 wand sweep per second.

Surface	Result
HDPE Test Plaque	<i>Zero Variation from Baseline / ASTM D3359-09 5B Classification, 0% loss</i>

Flexibility:

180° Flexing, 21°C (70°F), 240 continuous hrs.

Surface	Result
HDPE Test Plaque	<i>Zero Variation from Baseline / ASTM D3359-09 5B Classification, 0% loss</i>

Color Fastness:

ASTM D4587-11 (4 hrs. @ 70 C (158 F) irradiance 1 followed by 4 hrs. @ 50 C (122 F) condensation)

Surface	Result
HDPE Test Plaque	<i>Delta E Color Change - .69, Munsell Blue N2.5</i>





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Chemical, Hydrocarbon, and Fluid Resistance:

Test plaques were fully immersed in the following chemicals, hydrocarbons, and fluids at 21°C (70°F) for a total soak time of 500+ hours (ongoing). Results show no visible or mechanical changes, as indicated by Zero Variation from Baseline / ASTM D3359-09 5B Classification 0% loss.

Chemical	Surface	Result
Diesel Fuel	HDPE Test Plaque	Zero Variation from Baseline / ASTM D3359-09 5B Classification 0% loss
Unleaded Fuel	HDPE Test Plaque	Zero Variation from Baseline / ASTM D3359-09 5B Classification 0% loss
Engine Oil	HDPE Test Plaque	Zero Variation from Baseline / ASTM D3359-09 5B Classification 0% loss
Brake Fluid	HDPE Test Plaque	Zero Variation from Baseline / ASTM D3359-09 5B Classification 0% loss
Transmission Fluid	HDPE Test Plaque	Zero Variation from Baseline / ASTM D3359-09 5B Classification 0% loss
Windshield Fluid	HDPE Test Plaque	Zero Variation from Baseline / ASTM D3359-09 5B Classification 0% loss
Ethanol	HDPE Test Plaque	Zero Variation from Baseline / ASTM D3359-09 5B Classification 0% loss
Car Wash Fluid	HDPE Test Plaque	Zero Variation from Baseline / ASTM D3359-09 5B Classification 0% loss
Lubricating Oil	HDPE Test Plaque	Zero Variation from Baseline / ASTM D3359-09 5B Classification 0% loss
Hydraulic Fluid	HDPE Test Plaque	Zero Variation from Baseline / ASTM D3359-09 5B Classification 0% loss
Lacquer Thinner	HDPE Test Plaque	Zero Variation from Baseline / ASTM D3359-09 5B Classification 0% loss
Toluene	HDPE Test Plaque	Zero Variation from Baseline / ASTM D3359-09 5B Classification 0% loss
Methyl Ethyl Ketone	HDPE Test Plaque	Zero Variation from Baseline / ASTM D3359-09 5B Classification 0% loss
Acetone	HDPE Test Plaque	Zero Variation from Baseline / ASTM D3359-09 5B Classification 0% loss
Methanol	HDPE Test Plaque	Zero Variation from Baseline / ASTM D3359-09 5B Classification 0% loss
n-Hexane	HDPE Test Plaque	Zero Variation from Baseline / ASTM D3359-09 5B Classification 0% loss
Ethyl Acetate	HDPE Test Plaque	Zero Variation from Baseline / ASTM D3359-09 5B Classification 0% loss
Ethylene Dichloride	HDPE Test Plaque	Zero Variation from Baseline / ASTM D3359-09 5B Classification 0% loss
Diethyl Ether	HDPE Test Plaque	Zero Variation from Baseline / ASTM D3359-09 5B Classification 0% loss
Ammonium Hydroxide (20%)	HDPE Test Plaque	Zero Variation from Baseline / ASTM D3359-09 5B Classification 0% loss
ASTM Ref-Fuel C	HDPE Test Plaque	Zero Variation from Baseline / ASTM D3359-09 5B Classification 0% loss
2-Nitropropane	HDPE Test Plaque	Zero Variation from Baseline / ASTM D3359-09 5B Classification 0% loss
Acetic Acid (Glacial)	HDPE Test Plaque	Zero Variation from Baseline / ASTM D3359-09 5B Classification 0% loss
Furfural	HDPE Test Plaque	Zero Variation from Baseline / ASTM D3359-09 5B Classification 0% loss
Alkalai Solution pH 13	HDPE Test Plaque	Zero Variation from Baseline / ASTM D3359-09 5B Classification 0% loss
Turpentine	HDPE Test Plaque	Zero Variation from Baseline / ASTM D3359-09 5B Classification 0% loss
Kerosene	HDPE Test Plaque	Zero Variation from Baseline / ASTM D3359-09 5B Classification 0% loss
Muriatic Acid 20 baume 31.45%	HDPE Test Plaque	Zero Variation from Baseline / ASTM D3359-09 5B Classification 0% loss
Cooking Oil	HDPE Test Plaque	Zero Variation from Baseline / ASTM D3359-09 5B Classification 0% loss
Detergent-dishwasher	HDPE Test Plaque	Zero Variation from Baseline / ASTM D3359-09 5B Classification 0% loss
Detergent-laundry	HDPE Test Plaque	Zero Variation from Baseline / ASTM D3359-09 5B Classification 0% loss





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Lifetime Warranty

Polyfuze® Polymer Fusion Labels have demonstrated outstanding durability through years of testing and real-world performance, including weatherability, chemical, and abrasion testing, conducted according to ASTM standards. When applied in accordance with the Polyfuze® Raw Label Limited Warranty and the Label Inspection Standard, these labels consistently outperform other labeling technologies for polyolefin durable goods, maintaining legibility and print quality throughout the product's normal service life.

If any Polyfuze® label is found to be defective under normal conditions and in compliance with the Label Inspection Standard, Polyfuze® offers a warranty that includes label credit or replacement. For full details on warranty terms and conditions, visit the Polyfuze® Warranty Page at <https://polyfuze.com/warranty/>

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