

## 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 were designed specifically for use on all hard-to-decorate, low surface energy polyolefin thermoplastics (including all subgroups and many derivatives). These thermoplastics are a primary sourced substrate used for the manufacture of products, parts, and components in a variety of industries such as Reusable Packaging, Automotive, Power Equipment, Durable Consumer Goods, and more. Polymer Fusion Labels are the only labels guaranteed to be truly permanent on these thermoplastics.

Polymer Fusion is the science of merging two separate low surface energy plastic polymers together (polyolefin label + polyolefin component) utilizing melting point, time, and pressure, which produces a singular piece of plastic without the use of adhesives, tie-layers, bonding agents, or secondary surface treatments.

- Fully compatible with low surface energy polyolefin thermoplastics (no substrates, inks, or adhesives are used)
- Engineered specifically for difficult to label, low surface energy plastics
- Impervious to chemicals, UV, weather exposure, solvents, and extreme hot & cold temperatures
- Impervious to harsh factors such as dirt, oil, grime, high-temp engines/environments
- Exceed OEM standards for permanency and durability

### RoHS/FDA/CPSIA

The products you are procuring from Polyfuze™ Graphics Corporation were approved with one or more of the following compliances "FDA, RoHS, CPSIA "; the materials identified as prohibited on the Restricted Substances Specifications are not used in the manufacture or formulation of the materials used to produce our products. Restricted Substances are not intentionally added to the product, so their presence is not expected. Polyfuze™ Graphics Corporation not performed any testing on the raw material and relies on supplier provided (CofA) certification of analysis and SDS's. We recommend that any testing required to further validate the absence of prohibited materials should be performed by customers.



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### Performance Data

The following performance data is representative of polymer fusion label performance when applied to polyolefin substrates and tested. A control sample (defined as a blemish free, fully fused polymer fusion label to HDPE test plaque) was used as the baseline with all test samples compared against and results recorded. A Zero Variation from Baseline / ASTM 5B Classification 0% loss result meant samples had no visible or mechanical change after testing including no label transfer from substrate to specified tape used.

*All tests were conducted post fusion event with no pre-conditioning or surface treatments to substrate and were immediately followed by the ASTM D3359 Standard Test Methods For Measuring Adhesion By Tape Test (Test Method B) to test label fusion and permanence after extreme exposures.*

#### QUV Accelerated Weatherometer:

ASTM D4587-11 (8 hrs. @ 70°C (158°F) irradiance 1 followed by 4 hrs. @ 50° C (122°F) condensation) repeated continuously for total of 2000 hrs.

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. Test plaque was then exposed to Low Temperature, 2 hrs. -40°C (-40°F) immediately followed by High Temperature, 2 hrs. at 77°C (170°F). This test was repeated for total of 120 hrs.

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

#### Pressure Wash:

1200 psi, 49°C (120°F), 25° nozzle angle, 1-2" distance, total of 10 min.

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 Resistance:

Test plaques were fully immersed in following chemicals and hydrocarbons at 21°C (70°F) for a total soak of 200+ hrs.

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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### Warranty

The durability of Polyfuze™ Graphic Corporations permanent labels for polyolefin durable goods, hereby referred to as “ \*Polyfuze™ Labels ”, for polyolefin Durable Goods Products has been verified through years of lab testing and real world examples, including weatherability and chemical and abrasion testing according to ASTM procedures (Test Data Report Available Upon Request). Assuming any Polyfuze™ Fusion Label, which has been kept in accordance with Polyfuze™ Raw Label Limited Warranty <https://polyfuze.com/limited-warranty/>, is properly applied by the customer, Polyfuze™ warrants that the legibility and print quality of its labels will outperform other labels available today for durable goods manufactured from polyolefin thermoplastics (normal wear and tear excepted including normal discoloration and fade due to atmospheric conditions), for the “\*\*normal service life” of the product from the date of application under normal and intended use and service conditions. This warranty is expressly limited to any applied Polyfuze™ Fusion Label that is proven to be defective in material and/or workmanship to the satisfaction of Polyfuze™. If the applied Polyfuze™ Fusion Label fails to meet the warranty criteria of good commercial legibility and print quality under normal conditions, the customer must timely notify Polyfuze™ Graphics Corporation of any claimed defects and provide proof of the allegedly defective label to Polyfuze™ Graphics Corporation for inspection. If the applied label is determined defective, Polyfuze™ will provide the customer with label credit or a replacement label at no charge for the customer to re-install and/or place over the defective part in question as an alternative to molding another part.

POLYFUZE™ MAKES NO OTHER WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING ANY WARRANTY OF MECHANABILITY AND/OR OF FITNESS FOR A PARTICULAR, SPECIFIED OR INTENDED PURPOSE. POLYFUZE™ WILL NOT BE RESPONSIBLE OR PROVIDE REIMBURSEMENT TO THE CUSTOMER FOR ANY COSTS, EXPENSES OR DAMAGES ASSOCIATED WITH ANY DEFECTIVE LABEL, INCLUDING BUT NOT LIMITED TO THE TIME AND COST TO INSPECT AND RETURN THE DEFECTIVE LABEL, THE TIME TO RE-INSTALL THE REPLACEMENT LABEL, COMPENSATION FOR SCRAPPED CUSTOMER PARTS, ANY FORM OF REWORK, LOST PROFITS AND/OR ANY OTHER COSTS, EXPENSES OR DAMAGES ARISING OUT OF THE DEFECTIVE LABEL.



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