



## GM Certifications GMW14573 Polyfuz<sup>™</sup> Polymer Fusion Label Technology

### Performance Data

The following performance data is representative of polymer fusion label performance as certified by the General Motors Company.

*All tests referenced within GMW14573 are shown below. Results listed as N/A are due to Polymer Fusion Labeling Technology not being an adhesive-based label.*

#### Adhesion:

Test Name	Test Specs	Surface	Result
1a-Resistance To Peel Strength	Grip Separation 10mm/min	HDPE Test Plaque	N/A (not adhesive based)
1b-Cross-Hatch Tape Adhesion	GMW14829 (3mm)	HDPE Test Plaque	N/A (not adhesive based)
1c-Resistance To Peel Strength	ISO 8510-2 Grip Separation	HDPE Test Plaque	N/A (not adhesive based)
1d-Resistance To Peel Strength	ISO 8510-2 Grip Separation	HDPE Test Plaque	N/A (not adhesive based)

#### Abrasion Resistance:

Test Name	Test Specs	Surface	Result
2a-Abrasion-Resistance Linear	GMW14125 Friction Media	HDPE Test Plaque	N/A (plastics omitted)
2b-Abrasion-Resistance	GMW3208 CS10 Wheel 100 Cycles	HDPE Test Plaque	OK Appearance, ANSI Grade A
2c-Abrasion-Resistance	GMW3208 CS10 Wheel 300 Cycles	HDPE Test Plaque	OK Appearance, ANSI Grade A
2d-Abrasion-Resistance	GMW3208 CS10 Wheel 50 Cycles	HDPE Test Plaque	OK Appearance, ANSI Grade A

#### Fluid Resistance:

Test Name	Test Specs	Surface	Result
3a-Detergent fluid	Sonax or 9981285 Immersion	HDPE Test Plaque	OK Appearance
3b-Engine Oil	GME L0004 Classification A	HDPE Test Plaque	OK Appearance
3c-Windshield Washer Fluid	B 040 1990 Immersion	HDPE Test Plaque	OK Appearance
3d-Brake Fluid	GMW3356 Classification A	HDPE Test Plaque	OK Appearance
3e-Fuel	GMW14333-A	HDPE Test Plaque	OK Appearance
3f(1-2) - Ethanol fluid	GMW15891 chemical resistance	HDPE Test Plaque	OK Appearance
3g-Transmission Fluid	GMW16444 Immersion	HDPE Test Plaque	OK Appearance
3h-Ultra Low Sulfur Diesel Fuel	9986200 or BS EN590 Immersion	HDPE Test Plaque	OK Appearance

#### Humidity Resistance:

Test Name	Test Specs	Surface	Result
4-Humidity Resistance	GMW14729 144 hours method A or B	HDPE Test Plaque	OK Appearance, Rating = 5b





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#### Temperature / Weather Cycling / Heat Aging / Color Fastness Tests:

Test Name	Test Specs	Surface	Result
5a-Resist Temperature Cycles	90°C, 23°C, -30°C, 23°C cycling	HDPE Test Plaque	OK Appearance, Rating = 5b
5b-Resist Temperature Cycle	120°C, 23°C, -30°C, 23°C cycling	HDPE Test Plaque	OK Appearance, Rating = 5b
5c-Resist Temperature Cycles	150°C, 23°C, -30°C, 23°C cycling	HDPE Test Plaque	OK Appearance, Rating = 5b
6a-Heat Resistance Test	(7 days) 7 Days at 90° C	HDPE Test Plaque	OK Appearance, Rating = 5b
6b-Heat Resistance Test	(7 days) 7 Days at 120° C (Engine Compartment)	HDPE Test Plaque	OK Appearance, Rating = 5b
6c-Heat Resistance Test	(1600hrs)1600 hours at 150° C	HDPE Test Plaque	N/A (Does not pertain to plastic)
6d-Heat Resistance	(7 days) 7 Days at 120° C	HDPE Test Plaque	OK Appearance
7-Color Fastness to Artificial Lights	GMW14162 Method B 28 MJ/m2	HDPE Test Plaque	Delta E Color Change .69; Munsell blue N2.5
8a-Artificial Weather Resistance	GMW14797 Table 3- UV filter ≥600kJ/m2	HDPE Test Plaque	OK Appearance
8b-Artificial Weather Resistance	GMW14797 Table 3- UV filter ≥2500kJ/m2	HDPE Test Plaque	OK Appearance
9-Interior Trims Material Exposure	GMW14444 section 3.3.3 requirements	HDPE Test Plaque	OK Appearance
10-High Pressure Cleaning Resistance	GM9531P method A	HDPE Test Plaque	OK Appearance, Rating = 5b
11-Label Repositioning Test	Detach label 1 minute after adhering	HDPE Test Plaque	N/A (not a pressure sensitive label)
12-Vehicle Durability Corrosion	GMW14872	HDPE Test Plaque	N/A (Does not pertain to plastic)
13-Shear Test	GMW14162 Method B	HDPE Test Plaque	N/A (not adhesive based)
14-Transit Coating Test	Paints #9984168 (Transit Coatings Film)	HDPE Test Plaque	N/A (not temporary)





## GM Certifications GMW14573 Polyfuze™ Polymer Fusion Label Technology

### GM Referenced Standards:

9981285	GMW14162
9984168	GMW14333
9986200	GMW14444
B 040 1990	GMW14729
GM9531P	GMW14797
GME L0004	GMW14829
GME 14090	GMW14872
GMW3010	GMW15010
GMW3059	GMW15548
GMW3208	GMW15891
GMW3356	GMW16331
GMW14125	GMW16444
GMW14141	

### External Referenced Standards:

ISO-X12	ISO/IEC 15415
ISO 105-A02	BS EN590
ISO 5084	SAE J2527
ISO 8510-2	

### Test Criteria:

#### 2b, 2c, 2d Abrasion-Resistance:

Sample tested with Taber Rotary Abraser Model 5155, Abrasive Wheel CS-10, 500 gram Load Weight. Vac. Nozzle Gap: 1/8". Sample was conditioned for 24 hrs. at 68°F, 51% RH.

#### 3a Detergent Resistance:

Sample tested with immersion soak for 4 hrs. at 23 °C in detergent fluid.

#### 3b Engine Oil Resistance:

Per GME L0004 Classification A, immersion soak for 4 h at 120 °C; Classification G - Immersion for 4 h at 150 °C. Test modifications: at 120° C the plastic part melted. Tested at 100° C for 4 hours with success.

#### 3c Windshield Washer Fluid Resistance:

Sample tested with Immersion soak for 4 h at 23 °C in windshield washer fluid (B 040 1990).

#### 3d Brake Fluid Resistance:

Sample tested with Immersion soak for 4 h at 23 °C in brake fluid, reference GMW3356 Classification A.

#### 3e Fuel Resistance:

Sample tested with Immersion soak for 168 hrs at 23 °C in fuel, reference GMW14333-A.





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### Test Criteria:

#### **3f(1-2) Ethanol Fluid Resistance:**

Sample tested with Immersion soak for 12 hrs. in 90% Ethyl alcohol solution at 23° C.

#### **3g Transmission Fluid Resistance:**

Sample tested with immersion soak for 4 hrs. at 150°C. reference GMW16444.

Test modifications: at 150° C, the plastic part melted. test at 100° with success.

#### **3h Ultra Low Sulfur Diesel Fuel Resistance:**

Sample tested with immersion soak for 4 hrs. at 23°C in 9986200 or BS EN590.

Test modifications: immersion soak for 168 hrs with success

#### **5a,5b, 5c Temperature Resistance:**

Exposing part for 30 minutes at 90 °C, 15 minutes at 23 °C, 30 minutes at -30 °C, 15 minutes at 23 °C and then repeating for Two More Cycles.

#### **6a,6b Heat Resistance:**

Exposing part for 7 days at 90 °C, 7 days at 120 °C.

#### **7 Color Fastness to Artificial Lights:**

Exposing part for 400 hours in QUV. 8 hrs at 70° C with an irradiance of 1. 4 hours at 50° C w/condensation with no color change, reference GMW14162 Method B 28 MJ/m2. Delta E Color Change .69.

#### **8a Artificial Weather Resistance:**

Exposing part for 1333 hour cycle in QUV with irradiance = 1 at 70° C. Plus 666 hour condensation cycle exposure at 50° C. Reference GMW14797 Weather Resistance test, which requires SAE J2527 with Extended UV Filters, ≥ 600 kJ/m2.

#### **9 Interior Trims Material Exposure:**

(ASTM G7) Exposing part amount ~ 72,000 Langley's, in Florida at 5° south, open backed duration for 6 months. Reference GMW14444 section 3.3.3.

#### **10 High Pressure Cleaning Resistance:**

Part subjected to 3 minutes at 1200 psi, 49° C maximum temperature. The nozzle at a 90 degree angle, six inches distance from the sample then tape tested using the ASTM D3359-09 Adhesion test. Reference GM9531P method A.

