



# HONDA Certifications HES A 1045-11

## Polyfuzer™ Polymer Fusion Label Technology

### Performance Data

The following performance data is representative of polymer fusion label performance as certified on behalf of Honda Motor Company.

All tests referenced within HES A 1045-11 are shown below. Results listed as N/A are due to Polymer Fusion Labeling Technology not being an adhesive-based label.

#### 6-2 Scratch Resistance:

Test Name	Test Specs	Surface	Result
Scratch Resistance	Pencil Hardness Test	TPV Test Plaque	Passed: Hardness Value H

#### 6-5 Friction Resistance:

Test Name	Test Specs	Surface	Result
Friction Resistance	JSPS Friction Tester II	TPV Test Plaque	OK: Grade 4

#### 6-6 Chemical Resistance:

Test Name	Test Specs	Surface	Result
0.1 N HCL	JSPS Friction Tester II	TPV Test Plaque	OK: Grade 4
0.1 N NaOH	JSPS Friction Tester II	TPV Test Plaque	OK: Grade 4
10% Ethanol Solution	JSPS Friction Tester II	TPV Test Plaque	OK: Grade 4
Honda Genuine Glass Cleaner	JSPS Friction Tester II	TPV Test Plaque	OK: Grade 4
Honda Genuine Leather Cleaner	JSPS Friction Tester II	TPV Test Plaque	OK: Grade 4
10% Neutral Detergent	JSPS Friction Tester II	TPV Test Plaque	OK: Grade 4
Petroleum Benzine	JSPS Friction Tester II	TPV Test Plaque	OK: Grade 4
Honda Genuine Leather Wax	JSPS Friction Tester II	TPV Test Plaque	OK: Grade 4
Armor All	JSPS Friction Tester II	TPV Test Plaque	OK: Grade 4

#### 6-7 Water Spot Resistance:

Test Name	Test Specs	Surface	Result
Water Spot Resistance	Purified Water: Aging 90°C	TPV Test Plaque	OK: Grade 4

#### 6-8 Discoloration by Chemical:

Test Name	Test Specs	Surface	Result
0.1 N H <sub>2</sub> SO <sub>4</sub>	Room Temp. x 24 hrs.	TPV Test Plaque	OK: No Color Difference
0.1 N HaOH	55°C x 4 hrs.	TPV Test Plaque	OK: No Color Difference

#### 6-10 Tack-Free Test:

Test Name	Test Specs	Surface	Result
Tack-Free Test	No Gauze Mark After App.	TPV Test Plaque	OK: No Gauze Mark



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#### 6-13 Combustability Test:

Test Name	Test Spec - Requirement	Surface	Result
HES D 6003:2017	Condition 1, 81mm/min max	TPV Test Plaque	48.33 max
HES D 6003:2017	Condition 2, 81mm/min max	TPV Test Plaque	27.91 max
HES D 6003:2017	Condition 3, 81mm/min max	TPV Test Plaque	22.79 max
HES D 6003:2017	Condition 4, 81mm/min max	TPV Test Plaque	41.76 max
HES D 6003:2017	Condition 5, 81mm/min max	TPV Test Plaque	35.27 max

#### 6-14 Stain Resistance:

Test Name	Test Specs	Surface	Result
Honda Ultra Oil	0.2 ml on test surface	TPV Test Plaque	OK: Grade 4
Soy Sauce	0.2 ml on test surface	TPV Test Plaque	OK: Grade 4
Sauce	0.2 ml on test surface	TPV Test Plaque	OK: Grade 4
Mitsubishi Grease	0.2 ml on test surface	TPV Test Plaque	OK: Grade 4

#### 6-17 Heat Resistance:

Test Name	Test Specs	Surface	Result
Discoloration / Fade after Heat	Grade 4 or higher	TPV Test Plaque	No Result (Equipment NA)
Appearance after Heat	Grade 4 or higher	TPV Test Plaque	OK: Grade 5
Adhesion after Heat	100/100	TPV Test Plaque	100/100

#### 6-19 Water Proof Resistance:

Test Name	Test Specs	Surface	Result
Discoloration / Fade after Water	Grade 4 or higher	TPV Test Plaque	No Result (Equipment NA)
Appearance after Water	Grade 4 or higher	TPV Test Plaque	OK: Grade 5
Adhesion after Water	100/100	TPV Test Plaque	100/100

#### 6-20 Temperature Humidity Resistance:

Test Name	Test Specs	Surface	Result
Discoloration / Fade after Water	Grade 4 or higher	TPV Test Plaque	No Result (Equipment NA)
Appearance after Water	Grade 4 or higher	TPV Test Plaque	OK: Grade 5
Adhesion after Water	100/100	TPV Test Plaque	100/100

# HONDA Certifications HES A 1045-11

## Polyfuze™ Polymer Fusion Label Technology

### Test Criteria:

#### 6-2 Scratch Resistance:

Samples were exposed to 4 different pencil hardnesses (B, HB, F, H, HB) for this test. Pencils were held by hand at an approx. 45° angle to the label surface and applied at a speed of 3mm/s in 5 different areas and at a length of 10mm each. Samples were then checked for appearance.

#### 6-6 Chemical Resistance:

30mm x 220mm samples were installed to a JSPS type friction tester. 50mm x 50mm white cotton cloths soaked in appropriate chemical for 10 minutes were then applied to friction point. Friction was applied to a 100mm area on sample with a force of 2 N and at a speed of 30 return strokes per minute. Sample was then checked for appearance.

#### 6-7 Water Spot Resistance:

1cc of purified water was dropped onto label surface of sample. Water penetration was then checked and if not penetrated, wetted area was struck with fingertip to promote infiltrated water. Sample was then dried for 24 hrs. followed by 48 hrs. of conditioning and checked for appearance.

#### 6-8 Discoloration by Chemical:

Polyethylene cylinder (40mm x 15mm) was placed over top of, but in contact with, sample surface. 5ml of appropriate test liquid was then placed into opening of cylinder and closed with lid in accordance with each test liquid condition (0.1 N H<sub>2</sub>SO<sub>4</sub> - Room Temp. x 24 hrs., 0.1 N NaOH - 55°C x 4 hrs.). After test, samples were washed, dried, and measured.

#### 6-10 Tack-Free Test:

(5) 50mm x 50mm pieces of gauze were piled at center of sample surface with a 40mm cylinder at a weight of 500g placed on top. Sample was then conditioned at 70°C for 2 hrs. followed by conditioning at room temperature. All gauze was then removed, and sample checked for adhesion between sample surface and gauze and for any marks left on sample.

#### 6-13 Combustability Test:

In conformance of Honda HES D6003, 100mm x 356mm samples were individually exposed to specific deterioration conditions and then exposed to flame for 15 seconds.

#### 6-14 Stain Resistance:

0.2ml of test liquids (Honda Ultra Oil, Soy Sauce, Sauce, Mitsubishi Grease) were each placed onto samples and conditioned at 80°C for 2 hrs. Samples were then wiped with mild detergent and a soft cloth and checked for staining.



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### **6-17 Heat Resistance:**

Samples were exposed to 3 heat test conditions (90°C for 500 hrs., 105°C for 500 hrs., 105°C for 1000 hrs.), removed, and compared to non-exposed baseline samples for discoloration and/or fading. Samples were then checked for appearance and adhesion.

### **6-19 Water Proof Resistance:**

Samples were exposed to water at a constant temperature of 40°C for 24 hrs., removed, and compared with non-exposed samples for discoloration and/or fading. Samples were then checked for appearance and adhesion.

### **6-20 Temperature Humidity Resistance:**

Each sample was exposed to humidity test conditions 5 times at a temperatures of 80°C and 105°C. Samples were then compared to non-exposed samples for discoloration and/or fading. Samples were then checked for appearance and adhesion.

