

JFB Hart Coatings, Inc.

Summary of Independent Testing of HP-105 & HP-300 Satin/Matte

Test Description	ASTM	JFB Hart HP-105	JFB Hart HP-300
VOC Content	D3960	10 g/l	< 50 g/l
Weight Solids	D2369	55% Clear 53-59% Color	51% Clear 55-65% Color
Volume Solids	D2697	48% Clear 58-65% Color	49% Clear 47-58% Color
Free Isocyanate - HDI (Note 1)	GCMS	<0.0036%	<.004%
Freeze/Thaw resistance	D2243	Passed 5 cycles	Passed 3 cycles
Heat Package Stability (Note 2)	Special	Passed	Passed
Hiding	D2805	4 mils = 0.98	4 mils = 0.98
Dry Times at 75 degrees F:	D1640		
To Touch		2 hours	1.5 hours
To Handle		4 hours	3 hours
Full Cure		2 days	2 days
Sag Resistance	D4400	6.0 mils wet	6.0 mils wet
Pot Life at 75 degrees F	N/A	2 hours	1 hour
Condensing humidity--1000 hours:	D2247		
Rusting		10 (none)	10 (none)
Blistering		10 (none)	10 (none)
Salt Fog--1000 hours:	B117		
Rusting		10 (none)	10 (none)
Blistering (Note 3)		None	None
Scribe Undercutting (Note 4)		<0.5 mm	<0.5 mm
QUV--1000 hours	D4587		
Color Change (Note 5)		1.72	0.26
Gloss Change (Note 6)		-24.5	-9.2
Abrasion Resistance (Taber)	D4060	10-20 mg loss	30 mg loss
Pencil Hardness (Note 7):	D3363		
Gouge Hardness		4H	3H
Scratch Hardness		H	H
Tape/Knife Adhesion	D3359	5B (no loss)	5B (no loss)
Tensile Adhesion (Note 8)		2473-2609 psi	1600 psi
Impact Resistance (Note 9)	D2794	160 in-lbs.	160 in-lbs.
Flexibility (Conical Bend)	D522		
% Elongation (Note 10)		32%	32%
Resistance to Cracking (Note 10)		< 1/8" diameter	< 1/8" diameter
Chalking Evaluation post QUV (Note 11)	D4214	10 (no effect)	10 (no effect)
Special Thermal Cycling (Note 12)	Special	No effect	No effect
Water Vapor Transmission Testing (Note 13)	E96	2.43 perms	2.4 perms
Chemical Resistance (Note 14):	D1308		
Water		No effect	No effect
10% Hydrochloric Acid		No effect	No effect
Water with Detergent		No effect	No effect
Gasoline		No effect	No effect
MEK		No effect	No effect
Acetone		No effect	No effect
Isopropyl Alcohol		No effect	No effect
Xylol		No effect	No effect
Slip Resistance	Equivalent to D2047	Passed	Passed

Notes:

- 1: Indicates no free monomers go into atmosphere from the isocyanate.
- 2: Heated to 120 degrees F for two days and then cooled to ambient.
- 3: #6 medium = 1/8 to 1/16 inch blisters in medium quantities.
- 4: Indicates depth of rusting under the coating/result is a low value.
- 5: Passes based on SSPC Paint 36 standards for color change of less than 2.0.
- 6: Passes based on SSPC Paint 36 standards for gloss change of less than 30.
- 7: Hardness Scale: Softer to Harder: 6B-5B-4B-3B-2B-B-HB-F-H-2H-3H-4H-5H-6H.

- 8: The amount of force needed to delaminate coating from substrate.
- 9: Approximate height at which standard weighted object caused deforming of film.
- 10: Results indicate significant flexibility/did not crack.
- 11: Special testing for color fading from chalking.
- 12: Subject to 16 hrs freeze and 8 hrs at 120 F / day, 5 days / week for 6 weeks. Tested adhesion.
- 13: Reported Avg. Water Permeance of 2.43 perms; Avg. Vapor Permeability at 0.01 perm/inch.
- 14: JFB Testing was 24 hour spot exposure under a watch glass.



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Independent Chemical Resistance Testing (ASTM Test D1308)

<u>Test Description</u>	<u>Test Results</u>
Water	Passed
Water with Detergent	Passed
10% Hydrochloric Acid	Passed
20% Phosphoric Acid	Passed
40% Phosphoric Acid	Passed
Toluene	Passed
Gasoline	Passed
MEK	Passed
10% Oxalic Acid	Passed
Acetone	Passed
Isopropyl Alcohol	Passed
Xylol	Passed
25% Sodium Hydroxide	Passed
50% Sodium Hydroxide	Passed
20% Sodium Chloride	Passed
10% Sulfuric Acid	Passed
37% Sulfuric Acid (battery acid)	Passed
60% Sulfuric Acid	Passed
Hydraulic Fluid	Passed
Skydrol JP-4	Passed
Sodium Hypochlorite (Bleach)	Passed
Bleach	Passed
Betadyne	Passed
Ketchup	Passed
Mustard	Passed
Orange Juice	Passed

Note:

HP-105 & HP-300 were tested for Chemical Resistance using strong chemicals/mixtures placed under a "watch glass" cover for 24 hours. This test is extreme and far more severe than typical customer field conditions. It is important to note, the HP-105 & HP-300 can be repaired if it becomes damaged in field, by sanding and applying a new coat (product will blend with itself).