



## Specification Report

### **EXTERIOR GRADE High-Pressure Decorative Laminates**

**FORMILINE** Exterior Grade is specially developed for facades.

Exterior Grade can be exposed to sunlight and atmospheric agents such as rain, hail, wind and salinity. These phenomena do not affect its decorative surface or core layer. There is no delamination of the decorative layer. Natural changes in temperature and humidity have no adverse effects on Exterior Grade's properties.

Performance proprieties for Texture finish.

Property or attribute	Standard Test method	Unit	Specification	Typical Formiline Values	
				2,0 - 6,0 mm	> 6,0 mm
<i>Dimensional Change</i>	Nema LD 3 – 2005	%	MD ≤ 0,30	<b>0,30</b>	<b>0,16</b>
		%	CD ≤ 0,70	<b>0,62</b>	<b>0,38</b>
<i>Flexural Strenght</i>	Nema LD 3 – 2005	psi	MD ≥ 18.000	<b>23.169</b>	<b>26.541</b>
		psi	CD ≥ 12.000	<b>18.317</b>	<b>20.052</b>
<i>Módulus of Elasticity</i>	Nema LD 3 – 2005	psi	MD ≥ 1,6 x 10 <sup>6</sup>	<b>2,48 x 10<sup>6</sup></b>	<b>2,65 x 10<sup>6</sup></b>
		psi	CD ≥ 1,4 x 10 <sup>6</sup>	<b>1,47 x 10<sup>6</sup></b>	<b>1,75 x 10<sup>6</sup></b>
<i>Ball Impact Resistance</i>	Nema LD 3 – 2005	mm	Min. 1900	<b>&gt;1900</b>	
<i>Wear Resistance</i>	Nema LD 3 – 2005	Cycles	≥ 400	<b>&gt; 400</b>	
<i>Appearance</i>	Nema LD 3 - 2005	Rating	No ABC Defects	<b>No ABC Defects</b>	
<i>Boiling Water Resistance</i>	Nema LD 3 – 2005	Rating	No effect	<b>No Effect</b>	
<i>High Temperature Resistance</i>	Nema LD 3 –2005	Rating	Slight Effect	<b>No Effect</b>	
<i>Stain Resistance</i>	Nema LD 3 – 2005	Rating	Unaffected by reagents 1-10;	<b>No Effect</b>	
			Moderate 11-15	<b>No Effect</b>	
<i>Thermal Conductivity</i>	ASTM C 177	W/m.k	-----	<b>0,27</b>	
<i>Density</i>	ISO 1183	Kg/m <sup>3</sup>	1400 – 1500	<b>1400 – 1500</b>	
<i>Colour stability Xenoteste</i>	ISO 105 A 02	Grey Scale	---	<b>4-5 Exposure after 3000 hours of continuous exposure</b>	
<i>Chemical &amp; Stain Resistance</i>	<i>See list attached (page 2)</i>				

Where: MD = machine direction      CD = cross direction

Material that is stored in the wrong position may be deformed, even permanently.

- Store the panels in a closed place where normal climatic conditions are guaranteed.
- Stack the panels on top of each other on a flat base: never stand the panels on edge. Cover the uppermost panel with a slab or sheet of polythene.
- In the event of temporary storage outside, cover the panels completely with sheets of polythene protect them against the weather.

We recommend that the panels be conditioned at the site in which they are to be assembled, to prevent warping or anomalous dimensional variations.



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### **EXTERIOR GRADE High-Pressure Decorative Laminates**

#### **CHEMICAL & STAIN RESISTANCE**

##### **ACIDS**

1. Nitric Acid (all concentrations)\*
2. Glacial Acetic Acid. 99%
3. Sulfuric Acid (all concentrations)\*
4. Hydrochloric Acid (all concentrations)\*
5. Phosphoric Acid (all concentrations)\*
6. Formic Acid (all concentrations)\*
7. Acetic Acid (all concentrations)
8. Hidrofluoric Acid (48%)
9. Agua Regia \*
10. Chromic Trioxide (Chromoc Acid)
11. Perchloric Acid, concentrated
12. Picric Acid, 0,05M
13. Tannic Acid saturated
14. Uric Acid, saturated

##### **SOLVENTS**

15. Trichloroethylene
16. Carbon Dilsulfide
17. Acetone
18. Formaldehyde
19. Methanol
20. Ethyl Acetate
21. Toluene
22. n- Hexane
23. Ethyl Alcohol
24. Chloroform
25. Phenol
26. EDTA
27. Xylene
28. Butyl Alcohol damage
29. Amyl Alcohol
30. Amyl Acetate
31. o - Cresol
32. Dioxane
33. Trichloroethane
34. Chlorobenzene
35. Dimethyl Foramide
36. Methylene Chloride
37. Methyl Ethyl Ketone
38. Napthalene
39. Tetrahydrofuran

##### **BASES**

40. Sodium Hydroxide
41. Sodium Sulfide, 15%
- Ammonium Hydrixide (all concentrations)

##### **GENERAL REAGENTS**

43. Sodium Hypochlorite, 5%
44. Calcium Hypochlorite (concentrated)\*
45. HydrogenPeroxide 3%
46. Trisodium Phosphate, 30%
47. Sodium Thiocyanate
48. Zinc Chloride (all concentrations)
49. Lactated Ringers (salted mixture)
50. Sucrose, 50%
51. Gasoline
52. Kerosene
53. Mineral Oil
54. Vegetable Oil
55. Water
56. Sodium Chromate (Phosphorus Pentoxide)
57. Potassium Permaganate \*
58. Silver Nitrate \*
59. Formalin
60. Benedict's Solution
61. Phosfate Buffered Saline
62. Copper Sulfate
63. Petroleum Jelly
64. Aluminon (Tannic Acid)
65. Ethylene Glycol
66. Pine Oil
67. Methyl Methacrylate
68. Alconox (lab. Detergent)I
69. Karl Fsher Reagent
70. Urea
71. Naphtha
72. Cellosolve
73. Ammomia Phosphate
74. Iodine
75. Providone Iodine
76. Tncture of Mercurochrome \*
77. Tincture Iodine
78. Tincture of Merthiolate
79. Eucalyptol

80. Marcaine
81. Zephiran Chloride
82. Zinc Oxide Ointimet
83. Lysol (without hidrogen chloride)
84. Ammonia
85. Thimol and Alcohol
86. CMC (camphorated para-hlorophenol)
87. Quaternary Ammonia Compounds (Eugenol)
88. Monsel's Solution (Ferric Subsulfate)\*
89. Sodium Carbonate, 12,5%

##### **STAINS AND INDCATORS**

90. Bromothymol Blue
91. Phenolphthalein
92. Methyl Red
93. Methyl Orange
94. Ag. Eosin Bluish, 5% in Alcohol
95. Ag. Gentian Violet, 1%
96. Wright's Blood Stain
97. Methylene Blue
98. Sudan III
99. Nigrosine (India Ink)
100. Crystal Violet
101. Malachite Green
102. Cresol Red
103. Gram Stains
104. Safranin O
105. Thymol Blue

\* Causes slight change of gloss in dark colors, and severe change of in clear colors. The degree of is proportional to the length of exposure and concentration. All other items have no visible effect on the Laminates

##### **RESISTANCE TEST PROCEDURE**

The above chemicals were placed on the laminate under a watch glass for 16 hrs. Exposure effects were then evaluated.