ChemArmor®
HIGH PRESSURE
LAMINATES

Technical Bulletin

Nevamar® ChemArmor® High Pressure Laminate (HPL) has been tested and proven to have superior chemical resistance and significantly higher NEMA wear value than competitive laminates. It provides resistance to acids/bases, solvents, stains, indicators and general reagents.

ChemArmor® HPL continues to look good even in the harshest environments, making it ideal for horizontal surfaces in laboratories, healthcare facilities, schools, manufacturing plants, photographic processing work areas and more.

Product Composition

ChemArmor® laminate is manufactured in a flat press by combining decorative papers saturated in chemical resistant resin with phenolic impregnated kraft layers at pressures exceeding 1000 psi (6.9 MPa) and temperatures approaching 300˚F (150˚C). The panels are trimmed to size and the backs are sanded to facilitate bonding. The number of kraft layers used determines the thickness of the laminate. The laminating process combines the durability of chemical resistant resins with the aesthetics of decorative papers creating a surfacing material that has been the standard for many years.

Product Description

ChemArmor® HPL can be manufactured with brown or black phenolic core. Laminate edges can be polished for a finished appearance. To further enhance the edge appearance, ChemArmor® laminate can be manufactured with colored stripes within the core. Thicker grades of ChemArmor® laminate can be very heavy. Because of this increased weight, manual handling may be difficult. Please consult the chart for approximate sheet weight and thickness.

Typical ChemArmor® HPL Product Types

	NH28	NH48	NHD2	NHD5	NHD8	NHDI
Thickness (in.)	0.028	0.048	0.25	0.50	0.75	1.00
(mm)	0.71	1.2	6.4	13	19	25
Unit (lb/ft2)	0.21	0.34	1.82	3.68	5.43	7.44
Weight (kg/m2)	1.0	1.7	9.2	18.0	26.6	36.3

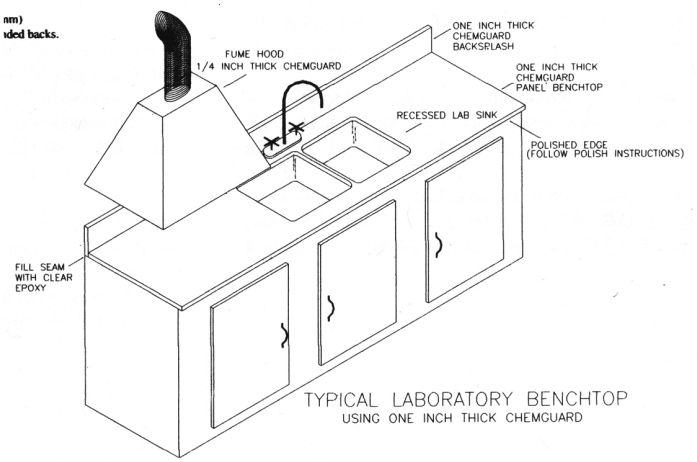
Colors and Sizes:

Colors:
ChemArmor® laminate is not available in all colors and patterns. Please check with your Customer Service Rep for available colors and patterns. ChemArmor® (NHY) requires a five-sheet minimum per size, color and grade. This material cannot be post formed. The finish for ChemArmor® laminate is always CA which is a textured finish. It can be purchased as fire rated if required (NHK3).

Nominal widths:
36” (915mm), 48” (1220mm) and 60” (1525mm)

Nominal lengths:
96” (2440mm), 120” (3050mm) and 144” (3660mm)

Other widths and thicknesses of ChemArmor® laminate are available upon request. ChemArmor® laminates thicker than 0.125” are not available with sanded backs.



Stain and Chemical Resistance

ChemArmor® Laminate is in conformance with NEMA LDS-2005 3.4 stain resistance and SEFA 8-PL-2010 recommended practices, section 8.1 chemical resistance.

Typical Uses

Typical uses include laboratory benchtops, cabinets, casework, and fume hoods. ChemGuard is ideal for photographic darkrooms, nurse's workstations, medical, dental and veterinary work areas, and mortuaries. Thicker ChemArmor® laminate can be used as structural components in laboratory benchtops, precluding the use of a substrate.

Fabrication Tips

When working with ChemArmor® HPL, these techniques will promote a quality application.

1. Proper conditioning of the laminate, substrate and backing sheet minimizes possible warping, shrinking, or expansion of assembled panels. Ideally, all components should be conditioned at 70˚F to 75˚F (21˚C to 25˚C) and 45 to 50 percent relative humidity for 48 hours prior to assembly.
2. Proper substrate must be used when bonding ChemArmor® laminate. Recommended substrates include particleboard and medium density fiberboard. Plaster walls, gypsum wallboard and concrete substrates are not recommended.
3. Permanent adhesive types, such as polyvinyl acetate (PVA), epoxy or resorcinol are recommended for ChemArmor® laminates with sanded backs. To enhance the chemical resistance at seams, epoxy adhesive may be used. For best results, follow the recommendations of the adhesive manufacturer.
4. The use of a backing sheet is recommended to minimize warpage. The thickness of the backing sheet should be similar to the thickness of the decorative laminate on the face of this assembly.
5. Epoxy adhesive is recommended for joining thick ChemArmor® components. Light sanding of the glue surface will improve bond strength.
6. All saw blades and router bits should be carbide tipped and well sharpened. Tool speed should be high and feed rate slow to minimize the possibility of chipping.
7. Inside corners of cutouts for electrical outlets, sinks, etc., should have a minimum radius of 1/8" (3mm) and be filed smooth. This reduces the likelihood of stress cracks.
8. All edges of laminate should be filed smooth with file direction towards substrate to help prevent stress cracks and to minimize chipping.
9. Drill oversize holes for fasteners such as screws or bolts.
10. Do not screw into the edges of ChemArmor® laminate.
11. Revealed edges of thicker panels may be shaped and/or finished using standard woodworking practices. The edges can then be polished with a light oil resulting in an attractive finish that accents the decorative surface.
12. All laminate is intended for interior use only, and should not be exposed to extreme humidity, continuous sunlight, or temperatures above 275˚F (135˚C) for extended periods of time.

ChemArmor® HPL Chemical Resistance Testing Results Following SEFA Procedures

Summary of Test Procedure (SEFA 8, Section 8.1)

Method A: Volatile chemicals are tested by placing a cotton ball saturated with the reagent in the mouth of a 1-ounce bottle and inverting the bottle on the surface of the laminate.

Method B: Non-volatile chemicals are tested by placing five drops of the reagent on the surface of the laminate and covering with 24mm watch glass.

For both methods, the reagents are left on the laminate for a period of 24 hours. The laminate is then washed with water, cleaned with detergent and naphtha, rinsed with deionized water and dried with a towel. The effect of the different reagents is evaluated according to the rating system below, after the laminate has equilibrated at a temperature of 73± 3˚F (23± 2˚C) and relative humidity of 50% for 24 hours. SEFA criteria for laboratory grade finishes are no more than four Level 3 conditions.

Acids	Level	0-No Effect	1-Slight change in color or gloss	2- Slight surface etch or surface stain	3-Surface deterioration
Hydrochloric acid	37%		X		
Sulphuric acid	33%	X			
Sulphuric acid	77%	X			
Sulphuric acid	98%			X	
Nitric acid	30%			X	
Nitric acid	70%				X
Phosphoric acid	85%		X		
Dichloroacetic acid		X			
Hydrofluoric acid	48%		X		
Chromic acid	60%	X			
Acid Dichromate	5%		X		
Sulfuric Acid 77% / Nitric Acid 70% - Equal Amounts				X	
Bases					
Ammonium Hydroxide	28%	X			
Sodium Hydroxide	10%	X			
Sodium Hydroxide	20%	X			
Sodium Hydroxide	40%	X			
Sodium Hydroxide, Flake		X			
Salt					
Silver Nitrate	Saturated		X		
Sodium Chloride	10%	X			
Zinc Chloride	Saturated	X			
Organic Chemicals					
Formaldehyde	37%	X			
Furfural		X			
Solvents					
Acetone		X			
Ethyl alcohol		X			
Ethylene glycol		X			
Methylethylketone		X			
Dichloromethane		X			
Ethyl acetate		X			
Amyl acetate		X			
n-Butyl acetate		X			
Methyl alcohol		X			
Phenol		X			
Ethyl Ether		X			
Toluene Trichloroethylene Xylene		X			

*All test results based on our knowledge of testing procedures
*Tests results may differ by color

Chemical & Stain Resistance

Resistance Test Procedure - The chemicals below were placed on ChemArmor® laminate under a watch glass for 16 hours. Exposure effects were then evaluated. (Test Method 3.4 per ANSI/NEMA LD3 Current Edition)

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. Hydrochloric Acid (48%) **
9. Aqua Regia *
10. Chromic Trioxide (Chromic Acid)
11. Perchloric Acid, concentrated
12. Picric Acid, 0.05M
13. Tannic Acid, saturated
14. Uric Acid, saturated

Solvents

15. Trichloroethylene
16. Carbon Disulfide
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
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%
42. Ammonium Hydroxide (all concentrations)

General Reagents

43. Sodium Hypochlorite, 5%
44. Calcium Hypochlorite (concentrated) *
45. Hydrogen Peroxide, 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 Permanganate *
58. Silver Nitrate *
59. Formalin
60. Benedict's Solution
61. Phosphate 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)
69. Karl Fisher Reagent
70. Urea
71. Naphtha
72. Cellosolve
73. Ammonia Phosphate
74. Iodine
75. Providone Iodine
76. Tincture of Mercurochrome *
77. Tincture of Iodine
78. Tincture of Merthiolate
79. Eucalyptol
80. Marcaine
81. Zephiran Chloride
82. Zinc Oxide Ointment
83. Lysol (without hydrogen chloride)
84. Ammonia
85. Thymol 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 INDICATORS

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 damage. The degree of damage is proportional to the length of is proportional to the length of exposure and concentration.

*Causes slight change of gloss or color. All other items

Care and Maintenance

Nevamar® ChemArmor® laminate provides a durable surface that is easy to maintain using ordinary care.

To maintain the laminate's lasting beauty, cleaning with a solution of warm water and liquid dishwashing detergent is all that should be required in most cases. Stains may be removed with most non-abrasive household cleaners such as FORMULA 409®, GLASS PLUS® or WINDEX® with AMMONIA D®. Light scrubbing with a soft bristled brush may be necessary to remove stains from the depth of the structure on some textured surfaces.

If the stain persists, use a paste of baking soda and water and apply with a soft bristled brush. Light scrubbing for 10-20 strokes should remove most stains. Although baking soda is a low abrasive, excessive scrubbing or exerting too much force may damage the decorative surface. Although ChemArmor® laminate provides superior chemical resistant properties, prolonged exposure to harsh chemicals can cause permanent damage. Timely clean up and neutralization of chemical spills will prolong the useful service life of the laminate.

Codes and Certifications

1. American National Standards Institute/National Electrical Manufacturers Association (ANSI/NEMA)LD3-2005, "High-Pressure Decorative Laminate" for HGS. Type NH48 complies.
2. American National Standards Institute/National Electrical manufacturers Association (ANSI/NEMA) LD3-2005, "High-Pressure Decorative Laminate" for CGS Types NHD2, NHD5, NHD8 and NHDI complies.
3. The City of New York, Dept. of Buildings, Materials and Equipment Acceptance Division approval codes are as follows: H48-MEA 207-93-M

Limited Warranty

Subject to the limitations set forth below, Panolam® Industries International Inc. (Panolam) expressly warrants that our products are reasonably free of defects in material and workmanship, and when properly handled and fabricated will conform, within accepted tolerances, to applicable manufacturing specifications as set forth in our technical brochure. This warranty shall extend to the original buyer for a period of twelve (12) months from the date of shipment of this product by Panolam, and shall not be assignable by the original buyer. This warranty does not cover damage resulting from accident, misuse, alteration, abuse or lack of reasonable care.

Due to the variety of uses and applications to which this product may be put, and because the manufacturer has no control over the end products fabricated, the warranty set forth above is exclusive and in lieu of all warranties, expressed or implied, in fact or by operation of law or otherwise, or arising by course of dealing or performance, custom or usage in the trade, including, without limitation, the implied warranties of fitness for a particular purpose and merchantability, and Panolam shall have no obligation or liability to any person or entity in connection with or arising from the furnishing, sale, installation or repair, use or subsequent sale of any product supplied by it.

Our maximum liability arising out of the sale of the products or their use, whether based upon warranty, contract, tort or otherwise, shall not exceed the actual payments received by us in connection therewith. In no event shall we be liable for special, incidental or consequential damages, including, but not limited to, arising hereunder or from the loss of profits, or loss of use damages, sales of the products.

Headquarters

Panolam® Industries International, Inc.
20 Progress Drive
Shelton, CT 06484
1-877-726-6526
www.panolam.com

panolam SURFACE SYSTEMS

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