KOROGARD® TECHNICAL INFORMATION





PROTECT YOUR WALLS IN STYLE.

KOROGARD WALL PROTECTION

Korogard Wall Protection is a complete line of products and custom solutions that are based on a systems approach. This allows users to mix and match a diverse array of colors while helping to maintain the beauty and style of a space. Unique products, such as Flex[™] Decorative Wall Protection and Traffic Patterns[®], offer designers the ultimate combination of aesthetics and performance.

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FIRE CODE COMPLIANCE



Korogard Protective Wallcovering is a fire retardant sheet with excellent cleanability and impact resistance. Korogard Protective Wallcovering is ideal for institutional applications because of its compliance with the national fire codes for building interiors and is available in two formulations, each providing Class A fire code compliance in thicknesses up to and including .125 in. (3.18 mm.). Standard inventory items .028 in. (.71 mm.), .040 in. (1.02 mm.), and .060 in. (1.52 mm.) are produced as Class A items. When requirements call for a Class A material in .080 in. (2.03 mm.), .093 in. (2.36 mm.), or .125 in. (3.18 mm.) thicknesses, Korogard 600 can be specified. Refer to charts below and the Test Results: Surface Burning Characteristics document for details on test results.

Fire code compliance is based on the results of the Steiner Tunnel Test (ASTM-E84). The parameters tested include flame spread and smoke generated by a product when it burns. To meet Class A fire code, an interior finish must have a flame spread of 25 or less and a maximum smoke developed rating of 450. Class B requires a flame spread of 26 to 75 and a smoke generated of 450 or less.

Fire code compliance involves using the tested adhesive. For .028 in. (.71 mm.), .040 in. (1.02 mm.), and .060 in. (1.52 mm.) thicknesses there are four adhesives that can be used to obtain a Class A fire rating: $3M^{TM}$ FastbondTM Contact Adhesive 30NF, Formulated Solutions XT2000+TM Mastic, Spray-Lock® FRP, and Dap® Weldwood® Nonflammable (see Korogard Protective Wallcovering Installation Manual). Korogard 600 Protective Wallcovering .080 in. (2.03 mm.), .093 in. (2.36 mm.), and .125 in. (3.18 mm.) must be installed with 3M Fastbond Contact Adhesive 30NF to ensure compliance with the Class A fire rating.

Korogard corner guards meet the criteria for Class A as outlined in the ASTM E-84 test.

ASTM E-84 Compliance Chart

Thickness	.028 in. (.71 mm.)	.040 in. (1.02 mm.)	.060 in. (1.52 mm.)	.080 in. (2.03 mm.)	.093 in. (2.36 mm.)	.125 in. (3.18 mm.)
Korogard 500	Class A	Class A	Class A	Class B	Class B	Not rated
Korogard 600	N/A	N/A	N/A	Class A	Class A	Class A
Signifies that any one of the four recommended adhesives may be used to meet the criteria for the indicated classification.						
Signifies that only 3M™ Fastbond™ 30NF may be used to meet the criteria for the indicated classification.						



Physical Properties	Test Method	Values
Specific Gravity	ASTM D-792	1.45
Mechanical Properties		
Tensile Strength at Yield (psi)	ASTM D-638	6,000
Elongation at Break (%)	ASTM D-638	154
Maximum Flexural Stress (psi)	ASTM D-790	10,200
Modulus of Elasticity (psi)	ASTM D-638	324,000
Hardness Durometer Shore D Rockwell R Rockwell L	ASTM D-2240 ASTM D-785	77 57
Abrasion Resistance: Taber test (wt. loss in g. CS-10 wheels, 1kg./wheel, 1000 cycles)	ASTM D-1044	0.015
Impact Strength	ASTM D-256	18
(ftlbs./in. of notch)	Izod Notched	
Impact Resistance	ASTM D-5420	6.5
(inlbs./mil)	Gardner Drop Dart	
Thermal Properties		
Heat Deflection Temperature Temperature @ 264 psi (annealed)	ASTM D-648	165-170°F (74-76.5°C)
Coefficient of Linear Thermal Expansion (in./in $^{\circ}F10_{\circ}$)	100°F (38°C)	4.5
	60°F (16°C)	4.2
Flammability Properties		
Fire Ratings	ASTM E-84 Tunnel Test*	
Flame Spread .060 in. (1.52 mm.) or less .093 in. (2.36 mm.) or less		20 35
Smoke Developed .060 in. (1.52 mm.) or less .093 in. (2.36 mm.) or less		350 350-450

^{*} UL® file #R6738. Product applied to a nonflammable substrate using 3MTM FastbondTM Contact Adhesive 30NF at an application rate of 130 square feet per gallon.

TEST RESULTS SURFACE BURNING CHARACTERISTICS



Korogard 500 Protective Wallcovering is intended for application with the specified adhesive in accordance with instructions accompanying the product.

Applied to Inorganic Reinforced Cement Board

	.050 in. (1.27 mm.) or Less*	.060 in. (1.52 mm.) or Less*	.093 in. (2.36 mm.) or Less*
Flame Spread	25	20	35
Smoke Developed	40	350	350-450
	.028 in. (.71 mm.) ++		
Flame Spread	20		
Smoke Developed	140		

Korogard 600 Protective Wallcovering is intended for application with the specified adhesive in accordance with instructions accompanying the product.

Applied to Inorganic Reinforced Cement Board

	.060 in. (1.52 mm.) or Less*	.080 in. (2.03 mm.) or Less*
Flame Spread	20	20
Smoke Developed	130-175	250

^{*} Applied with 3MTM FastbondTM Contact Adhesive 30NF at an application rate of 130 sq. ft. per gallon.

⁺⁺ Applied with XT2000+™ Mastic adhesive at an application rate of 120 sq. ft. per gallon or Spray-Lock® FRP adhesive at an application rate of 70 sq. ft. per can.

TEST RESULTS TRAFFIC PATTERNS®



Mechanical Properties	Test Method	Values
Impact Resistance (in.lb.f)	ASTM D-5420 (Drop Dart)	37.3
Scratch Resistance (kg)	ASTM D-2197 (Hoffman Scratch)	4.5
Abrasion Resistance (wt. loss %)	ASTM D-1044 (Taber) (CS-10F Wheel 500gm Load-100 cycles)	0.006%
Flammability Properties		
Fire Ratings	ASTM E-84 (Steiner Tunnel)	Class A
Flame Spread	(NFPA 255, ANSI/UL 723 & UBC 8-1)	
3M™ Fastbond™ 30-NF		20
Formulated Solutions XT2000+ TM Mastic		20
Spray-Lock® FRP		20
Smoke Developed		
3M™ Fastbond™ 30-NF		160
Formulated Solutions XT2000+ TM Mastic		150
Spray-Lock® FRP		160
Surface Properties		
Bacterial Resistance	ASTM G-22	No Growth
Fungal Resistance	ASTM G-21	No Growth
Chemical Resistance	ASTM D-1308 (20 Reagents)	No Effect
Stain Resistance	ASTM D-1308 (20 Reagents)	No Permanent Effect
Water Absorption (%)	ASTM D-570 (24 hrs.)	1.08%

TEST RESULTS CHEMICAL RESISTANCE (SOLID COLOR PRODUCTS)



Chemical Resistance ASTM D-543

Chemical	7 Days Immersion at 73°F (23°C)	Chemical	7 Days Immersion at 73°F (23°C)
50% Hydrofluoric Acid	No Change	5% Phenol	Very Slightly Whitened
30% Hydrofluoric Acid	No Change	10% Sodium Chloride	No Change
62% Perchloric Acid	No Change	3% Hydrogen Peroxide	No Change
50% Perchloric Acid	No Change	95% Ethyl Alcohol	No Change
10% Hydrofluoric Acid	No Change	50% Ethyl Alcoho	No Change
30% Sulfuric Acid	No Change	Acetone	Attacked
3% Sulfuric Acid	No Change	Ethyl Acetate	Attacked
70% Nitric Acid	No Change	Ethylene Dichloride	Attacked
50% Nitric Acid	No Change	Carbon Tetrachloride	Very Slightly Whitened
30% Nitric Acid	No Change	Toluene	Attacked
10% Nitric Acid	No Change	Heptane	No Change
10% Citric Acid	No Change	Trichloroethylene	Attacked
5% Acetic Acid	No Change	Lube Oil Mil-O-5606	No Change
10% Citric Acid	No Change	Lube Oil Mil-L-7808	No Change
Oleic Acid	No Change	Lube Oil Mil-L-23699	No Change
10% Sodium Hydroxide	No Change	ASTM Oil No. 3	No Change
1% Sodium Hydroxide	No Change	Jet Fuel JP-4	No Change
10% Ammonium Hydroxide	No Change	Jet Fuel JP-5	No Change
2% Sodium Carbonate	No Change	Water	No Change

TEST RESULTS CHEMICAL RESISTANCE (SOLID COLOR PRODUCTS)



Chemical and Stain Resistance to Potable Liquids, Cleaners, Polishes, Detergents, etc. after 30 Days Contact

	Chemical Resistance		Staining Tendency	
Material	73°F (23°C)	140°F (60°C)	73°F (23°C)	140°F (60°C)
Wesson® Oil	No Change	No Change	None	None
Mazola® Corn Oil	No Change	No Change	None	Slight
Coppertone® Suntan Oil	No Change	No Change	None	Slight
Lestoil®	No Change	Slight Attack	None	Slight
Simoniz® Wax	No Change	No Change	Very Slight	Medium
Household Ammonia	No Change	Slight Attack	None	Slight
all® Laundry Detergent	No Change	No Change	None	Slight
Regular Esso [™] Gasoline	No Change	-	Very Slight	-
Mennen Skin Bracer®	No Change	-	None	-
Tomato Juice	No Change	No Change	Very Slight	Medium
Prune Juice	No Change	No Change	Very Slight	Slight
Orange Juice Concentrate	No Change	No Change	Very Slight	Slight
Tea	No Change	No Change	Slight	Slight
Coffee	No Change	No Change	Very Slight	Medium
Isopropyl Alcohol	No Change	-	None	-
Pond's® Cold Cream	No Change	No Change	None	Slight
Butter	No Change	No Change	None	Slight
Mayonnaise	No Change	No Change	None	Slight
Mustard	No Change	No Change	Slight	Medium
Grape Juice	No Change	No Change	Slight	Slight
Clorox®	No Change	No Change	None	Slight
Pepsi [®]	No Change	No Change	None	Slight
Water	No Change	No Change	None	Slight

REPEATED ROLLER MARKS



Korogard Protective Wallcovering is an extremely durable fire rated protective wall and door surfacing material for application in environmentally controlled building interiors. Korogard sheets and rolls are widely used in areas subject to high-traffic abuse where the exceptional impact, gouge, and scratch resistance of a Korogard surface minimizes damage and related maintenance costs. Excellent cleanability and chemical resistance provide maximum protection from stains and graffiti.

The attributes of Korogard Protective Wallcovering are a result of the specialized extrusion process utilized when manufacturing the sheets and rolls. Color is integral throughout the product. Texture and gloss are permanently embossed as the sheet is manufactured, not in a secondary process. This specialized extrusion process results in a repeating pattern across each panel. This pattern is present on all Korogard semi-rigid wallcovering. Repeating patterns are inherent in the product and will not be considered a material defect.

CLEANING KOROGARD PROTECTIVE WALLCOVERING



General Information

Korogard Protective Wallcovering will retain its original beauty with reasonable handling and care. To ensure that your wallcovering maintains its original appearance, please review the following guidelines.

To clean Korogard sheet, dust it with a soft, damp cloth or chamois and wipe the surface gently. Use soap and lukewarm water to remove light dirt. After washing and rinsing, be sure to dry the surface by blotting with a damp cloth or chamois to prevent streaking and water spots.

For general (routine) cleaning, the following mild detergents and multi-purpose cleaners are recommended:

• Joy®

• Janitor in a Drum

• Cascade®

all[®] Detergent (powder)

Fantastik®

Formula 409[®]

Isopropyl alcohol

SoftScrub®

Normal cleaning methods may not remove ground in dirt or grease. To remove dirt or grease from texture valleys, a short stiff bristled brush should be used to loosen the material followed by a water rinse.

Cleaners Not Recommended

Wisk®

all[®] Detergent (liquid)

Kerosene

Pine-Sol®

Persil® ProClean®

Brake Fluid

Methanol

Endust®

Gasoline

 Meguiar's® Carpet & Upholstery Cleaner Ketones

Hexane

Tetrahydrofuran

Abrasives

Cold Power[®] Liquid

Goof Off "Works The 1st Time!" *

Lestoil®

Dynamo

Isopar™ K

*Note: The chemical composition of Goof Off has been reformulated. This updated formulation has been observed to have an affect on Korogard sheet. The previous formulation may be identified by the phrase "The Professional Cleaner" on the can and is produced by Valspar®. This formulation is still recommended for use on Korogard sheet. The updated formulation may be identified by the phrase "Works The 1st Time!" on the can and is produced by W.M. Barr & Co. Korogard is investigating suitable alternatives to the Goof Off product.

In-Use Spot Cleaning

Tough marks or stains due to spills, graffiti, heal marks, etc., usually require cleaners such as DWR-II®, Zep® Write Away, and Valspar® Goof Off to provide good results when trying to remove graffiti marks. These are specialized spot cleaners that should be used for small areas only. A short, stiff, bristled brush may be necessary to remove some stains from the textured surface. These cleaners should also be rinsed thoroughly with clean water. Some heel marks or abrasions from rubber bumpers on carts may be removed simply by brushing without a cleaner.

CLEANING KOROGARD PROTECTIVE WALLCOVERING



Problem	Staining Agent	Solution
Discoloration at seams and edges of sheets	Dried adhesive or caulking residue from installation of protective wallcovering	Use mineral spirits, naptha, or other commercially available solvent. Apply sparingly with a clean rag and rub in a small circular manner, being careful not to spread the adhesive over a larger area. The reactivated adhesive or caulking will be suspended in the solvent. The entire stained area should be rinsed with clean water before the solvent evaporates.
Residue from general pedestrian traffic	Oils, soda, juice, coffee, mustard, food stains, etc.	Use a commercially available liquid cleanser (SoftScrub®, Fantastik®, Formula 409®, etc.) that does not include bleach or ammonia. Apply product sparingly and wipe in small circles with clean, damp rag.
Tough stains embedded in texture of sheet	Grease, ink, blood, betadine, etc.	Use a commercially available liquid cleanser (SoftScrub®, Fantastik®, Formula 409®, etc.) that does not include bleach or ammonia. Apply product sparingly and scrub in small circles with a stiff nylon bristle brush. Rinse the area with clean water. Repeated treatment may be required for especially tough stains.
Extreme stains on sheet	Permanent marker, paint, nail polish, etc.	Use a commercially available graffiti remover*. These are specialized spot cleaners that should be used for stained areas only. A stiff nylon short bristle brush may be necessary to remove some stains from the textured surface of the sheet. These cleaners should be rinsed thoroughly with clean water.
Scuff marks and black streaks on texture of sheet	Rubber transfer from carts, gurneys, wheelchairs, heel marks, etc.	Use a stiff nylon short bristle brush with a mild soap and water solution. Repeated scrubbing may be required to remove rubber that has transferred to the textured surface of the sheet.

*Sources for Graffiti Removers:

Crown® Anti-Vandal Spray by Aervoe Industries800.227.0196DWR-II® by Chemique, Inc.800.225.4161Zep® Write Away877.428.9937

Do Not Use the Following Products:

Powdered cleansers (Ajax®, Comet®, Spic and Span®, etc.) Ammonia based cleansers (Mr. Clean®, Top Job®, etc.) Acrylic floor strippers Undiluted bleach

Why Not?

Leaves a chalky residue Leaves a hazy film Permanently discolors surface Leaves a hazy film

KOROGARD PRODUCTS THAT CONTRIBUTE TO A BUILDING ACHIEVING LEED® CREDITS



	Indoor Environmental Quality (EQ) CA01350 Low-Emitting Materials
Protective Wallcovering	
Korogard sheets	•
Traffic Patterns®	•
Flex [™] Decorative Wall Protection	•
Digitally Printed Protective Wallcovering	•

PAINTING KOROGARD



Korogard Protective Wallcovering is easily painted if recommended paints are used in accordance with manufacturer's recommendations. Due to the high chemical resistance of Korogard sheet, only certain paints adhere well. It is very important to use recommended paints to paint Korogard sheet. Research has been performed into which paints are suitable and what methods should be used to successfully paint Korogard sheet. These methods have proven successful in the field and will provide excellent results

Paint Selection

Environmental concerns and legislation have caused the creation of paints with differing levels of Volatile Organic Compounds (VOC). High VOC level paints have a high solvent content. Low VOC level paints exhibit a lower level of solvent content and also do less environmental damage. Some states and counties have legislated what VOC levels may be legally used in their jurisdiction. Please check with local officials to learn if any restrictions on VOC levels exist before selecting a paint.

Normal VOC level paints have proven successful to paint Korogard sheets. Methods have been discovered to make low VOC paints adhere to Korogard sheets. Contact your local Koroseal® sales representative if assistance is needed when using low VOC paints. The following paints are recommended for painting Korogard sheets:

Recommended Paints	Call for Information
Sherwin-Williams® Polane® Series	800.331.7979
Cardinal® Polyurethane Series	800.696.5244

Considerations When Using Recommended Paints

- Low VOC level paints have demonstrated lower adhesion properties. If a low VOC paint must be used, surface preparation prior to painting may increase adhesion. See "Surface Preparation" below.
- Retarding agents are available from paint manufacturers which have increased paint adhesion in laboratory testing. These retarding
 agents cause the paint mixture to evaporate slower, giving the paint more time to attack and adhere to the surface. As an example,
 adhesion of Polane T Plus paint was increased when Reducer 84 was replaced by retardant R7K216 in the paint mixture.

Surface Preparation

Paint adhesion can be increased by preparing the Korogard sheet surface prior to painting. If paint adhesion problems are encountered, try the following surface preparation techniques. Always check to make sure using any of the methods listed below does not violate existing environmental statutes.

- Sanding—Sand the surface using fine grit sandpaper. This will roughen surface and make it more suitable for paint adhesion. Wipe the surface with dry cloth after sanding to remove debris.
- Isopropyl Alcohol (IPA) Wiping—A Korogard sheet surface can be wiped using IPA or rubbing alcohol prior to painting. This
 method of treatment helps paint attack the surface and creates a strong bond to the Korogard sheet.

Paints NOT Recommended

The following types of paints have provided poor adhesion in laboratory testing. Koroseal® does not recommend the use of the following paint types:

Epoxy Paints
 Water-Based Paints
 Latex Paints
 Enamels

Even though Korogard sheets have experienced difficulties with the paints listed above, customers may experience success with these paint types in the field.

MECHANICALLY FASTENING KOROGARD



If solvent bonding is not feasible for your specific application, Korogard thermoplastics can also be mechanically fastened. Some guidelines are listed below.

- Where rigid fasteners are used, consideration must be given to the thermal expansion differential between Korogard and any other
 material to which it will be joined. To allow for this differential, holes oversized by 1/16 in. (1.59 mm.) in diameter should be
 drilled into the Korogard. Failure to allow for thermal expansion differentials may result in objectionable buckling during temperature
 changes.
- Where mechanically fastened Korogard assemblies are to be subjected to high stress, the use of nylon or rubber washers or large-headed fasteners is recommended to prevent the fastener heads from pulling through the Korogard. Also keep in mind that high tension should not be used when riveting Korogard.
- Other options for fastening include the use of foam tapes or velcro.

For more information on fastening Korogard, contact your local Koroseal® sales representative.



Bonding Korogard to Wood

For bonding Korogard to wood, there are various adhesives that are recommended. They are Formulated Solutions XT2000+™ Mastic, 3M™ Fastbond™ 30NF, and Dap® Weldwood® Nonflammable. When using any of these adhesives, the substrates must be free from dirt, grease, and dust. To clean the Korogard surface, wipe with a solvent such as isopropyl alcohol before you apply the adhesive. Although it isn't always practical, keep in mind that for all of these adhesives, best results will occur when the bonding process is done in a temperature-controlled environment of approximately 65°F (18°C) to 75°F (24°C).

If you choose to use $3M^{TM}$ Fastbond TM 30NF, Formulated Solutions XT2000+ TM Mastic, or Dap® Weldwood® Nonflammable, we suggest applying a latex primer to the wood before applying the adhesive. Although the primer is not mandatory, it will decrease the amount of adhesive that absorbs into the wood when the first coat is applied.

For installation with contact adhesives, apply two coats to the wood. Allow the first coat to dry thoroughly before applying the second coat. Apply one coat to the Korogard sheet. Adhesive should be dry and not feel tacky when you're joining the substrates together. Koroseal recommends a minimum of 45 minutes be allowed before adhering the substrates. After adhesive dries, three hours remain to complete the job. THE LONGER YOU WAIT (up to four hours total), THE STRONGER THE INITIAL BOND WILL BE. Apply pressure to ensure that good contact is made. For hand lay-up, the Crain #333 high-pressure roller is recommended. Note that contact adhesives bond immediately upon contact. Utilization of slip sheets is highly recommended to prevent accidental bonding.

Installation with mastic adhesive requires that the adhesive is only applied to one of the substrates—specifically the wood surface. Be sure to cover 100% of the wood surface area, maintaining uniform coverage with a notched trowel. Insufficient adhesive is the cause of most problems. Allow adhesive to set up according to the instructions on the adhesive container label. After joining the substrates, apply pressure to ensure good contact (the Crain #333 high-pressure roller is recommended).

For More Information on These Adhesives:	Call
3M™ Fastbond™ 30NF	800.362.3550
Dap® Weldwood® Nonflammable	888.327.8477
Formulated Solutions XT2000+™ Mastic	Your local Koroseal® sales representative

Bonding Korogard to Metal

For bonding Korogard to metal, including aluminum, cold rolled steel or other grades of steel, and stainless steel, Dap® Weldwood® Nonflammable can be used with good results.

When using this adhesive, the substrates MUST be free from dirt, grease, and dust. To clean the surfaces, wipe with a solvent such as isopropyl alcohol before you apply the adhesive. Best results will occur when the bonding process is done in a temperature-controlled environment of approximately 65°F (18°C) to 75°F (24°C).

Dap® Weldwood® Nonflammable is a contact adhesive. One coat of the adhesive should be applied to the metal and one coat to the Korogard. Wait until the adhesive is tack-free and then join the substrates. Apply pressure with a pressure roller (Crain #333) to ensure good contact.

For More Information on This Adhesive:	Call
Dap® Weldwood® Nonflammable	888.327.8477

CAULK



Product Description: Korogard Wall Protection Systems provides an acrylic-based, evaporative cure sealant with a special silicone modifier that is color-matched to Korogard Protective Wallcovering standard colors. Korogard caulk is packaged in 10.5 oz. cartridges.

Product Uses: Korogard caulk will help provide a Korogard Protective Wallcovering installation with a finished appearance. Korogard caulk may be used as an alternative to moldings for inside corners and for the expansion gap between sheets. Korogard caulk will still allow for the normal thermal expansion of Korogard Protective Wallcovering when extruded into the required 1/16 in. (1.59 mm.) gap. When applied properly, Korogard caulk will provide waterproof seam treatment.

Installation: Surfaces should be free of oils, dust, old caulking, or other contaminates. Korogard caulk may be installed between temperatures of 65°F (18°C) and 80°F (27°C). The caulk darkens to color-match as it dries. A 10.5 oz. tube of caulk provides approximately 95 linear feet of coverage. Joint dimensions should not exceed 3/8 in. (9.53 mm.) x 3/8 in. (9.53 mm.). Tooling is recommended immediately after application to ensure firm contact with joint interfaces. Hands and tools should be cleaned with soapy water before the caulk dries.

Specification: Color-matched caulk shall be provided by Koroseal®. The caulk shall be acrylic-based with a silicone modifier. The caulk shall have the same color number as the Korogard Protective Wallcovering. Specification typically falls under Section 2.8 Part D.



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