COA # 2010-COA-169 (HMP)	INDIANAPOLIS HISTORIC PRESERVATION COMMISSION STAFF REPORT Video http://indianapolis.granicus.com/MediaPlayer.php?view_id=39&clip_id=4284	Hearing Date JUNE 2, 2010
	2001 N. DELAWARE ST. **HERRON-MORTON PLACE**	NEW CASE
	Applicant **RHINO SHIELD FOR LAWRENCE MARK** mailing address: 748 Massachusetts Avenue Indianapolis, IN 46204	
	Owner: **Lawrence Mark** 2001 N. Delaware St. Indianapolis, IN 46202	Center Twp. Council District 15 Doris Minton-McNeill
	CASE	
IHPC COA: 2010-COA-169 (HMP) Application of a ceramic coating system to an historic house.		
STAFF RECOMMENDATION: Denial		

STAFF COMMENTS

Background of the Property

The house was constructed between 1896 and 1898. It is a 2 ½ story single family Queen Anne residence located at the northeast corner of 20th and Delaware Streets. It features a gable roof with a divided lite double-hung window flanked by quarter-round windows, a decorative masonry chimney, decorative brackets and dentil detailing.

Existing Siding

The house is clad with wood clapboard siding. Staff has inspected the siding and it appears to be in good condition. There is no record that the siding has been replaced or repaired since Herron-Morton Place was designated in 1986. The paint on the house today appears to be in fair condition. There is some peeling and flaking in the front gable and visible on fascia boards and other trim work. Since painting is exempt in Herron-Morton Place, we have no record of when it was painted last. The applicant is asking to cover the exterior of the building in a ceramic coating system called "Rhino Shield."

IHPC Policy about Permanent Coating Systems

Permanent coatings first came to staff's attention when one of these products was being used on a historic property in 1999. Staff researched the products at that time and developed a policy. The commission expressed agreement with the policy when staff presented it to them at a pre-meeting. Staff then published the policy in the December 1999 issue of "This Old Column" (copy attached to this report), which was distributed to historic neighborhood associations.

In addition to the concerns raised in "This Old Column," others include:

- Lack of reversibility and the long-term effects on coated items*
- Inability to repaint with conventional paint at a later date*
- Loss of architectural detailing and crisp shadow lines. Product literature claims that, when properly applied, the resulting coat is ten times thicker than a coating of conventional paint*

** The applicant's submission refutes these concerns as included in this report below.*

2003 IHPC Decision Denying the Product "Liquid Siding"

In 2003, this Commission reviewed a request at 623 E. St. Clair Street to coat a house in a product called, "Liquid Siding." The request was denied based on 9 points including some of the following concerns:

- Removing paint and finishes down to a bare surface can permanently damage the surface.
- The use of these products appears to result in a permanent alteration to the material on which the product is applied.
- Permanent coatings are not immune to failures such as peeling, bubbling and surface imperfections.
- Proper application of the product requires all joints, cracks and seams between lapboards, trim pieces, etc. to be sealed with a special caulk limiting the historic buildings air movement or ability to "breathe." The movement of air through the many minute cracks of an historic building is crucial for the proper escape of naturally occurring moisture. Sealing these openings would result in trapped moisture, which in turn could result in damage and/or mold problems.
- Proper installation requires techniques like spraying and painting only the front surface of trim pieces. These techniques are not characteristic of historic painting techniques and add to a flat appearance.
- Once applied, this material appears to be more difficult to "re-coat" if another color is desired.
- The product appears to require more care to repair or re-coat than traditional paint.
- The thickness of the product is equal to that of a credit card, dulling the crispness of the existing details and reveals.

The Rhino Shield Product

The applicant states:
"Rhino Shield is a water-based (latex) paint that has eliminated all of the non functional fillers common in less expensive, less effective paints. This formulation uses only the highest quality additives – 100% acrylic resin, titanium dioxide, and 3M ceramic microspheres. The product is 57% solids by weight. Many retail paint companies are now offering ceramics as an additive for their paints to improve the performance. The uniqueness of Rhinoshield is in its permeability. It is highly resistant to water penetration yet vapor and gasses are allowed to escape. Houses are allowed to breathe reducing moisture and/or mold issues. Rhinoshield has been tested by BASF labs verifying this unique property."

The Rhino Shield corporate web site describes the product as:
"a durable, flexible maintenance free wall coating. It is a high build acrylic-urethane-elastomeric formula that waterproofs, insulates, and soundproofs. Innovative technology combines elastomeric acrylic resins with urethane resins resulting in a flexible but tough surface. This thick rubber-like membrane actually becomes part of the substrate due to excellent adhesion and bonding. Rhino-Shield Ceramic Coating offers superior mildew resistance, corrosion resistance, and ultra-violet ray reflectivity. This insulating, industrial, maintenance-free coating is long lasting.

The Rhino Shield website notes a 12 step preparation and application process as follows:

1. *Thorough Inspection* - this is done to determine the condition of the underlying substrates and what work will be needed.
2. *Trenching* – a 4 to 6 inch deep trench around the foundation is dug and Rhinoshield's exclusive waterproofing primer sealer is applied to assure a barrier of protection against water wicking up the walls and to prevent growth of algae, fungus, and decay below ground level. *(The applicant states this step will not be performed on 2001 N Delaware as the foundation is raised and the siding is approximately 3 ft off the ground.)*
3. *Cleaning and Washing* – the entire surface is power washed. Typically TSP and bleach is used to clean and kill all existing mold, mildew and fungus. The goal is to have a clean dry surface to bond

to. *(The applicant indicates this is typically done at 1500 psi but could be done with a garden hose if necessary. Staff typically recommends 400-600 psi or less.)*

4. *Patch and Repair* – All cracks, holes, chips and breaks on the home are filled and sealed.
5. *Sanding and Scraping* – All loose paint on wood surfaces is removed by scraping and any remaining paint is sanded by hand or machine to leave a smooth surface to coat.
6. *Caulking* – Once the wood surfaces have been scraped and sanded, cracks and small holes around all windows and door casings are filled to prevent moisture from invading the coating through these areas. The website touts, "*Fact" we use over a case of caulking, on average, to seal all the jointed surfaces on the wood."*
7. *Masking* – All areas which are not to be coated are masked off.
8. *Priming* – A solid coat of Rhinoshield Adhesive Primer Sealer is applied to make the finish coat stay on your house without cracking or peeling.
9. *Apply the Finish Coats* – Two coats of the ceramic top-coat is applied. The top-coat is sprayed at a rate of 100 square feet per gallon or greater to achieve the optimal mil-thickness. Brushing or rolling may be required in tight areas. *(The applicant indicates the web site is incorrect and they only apply one coat of the finish coat. Additionally he notes that one coat is approximately 6-8 mils in thickness similar to 2 coats of typical latex paint.)*
10. *Detail Touch up* – After the final finish coat is applied, the exterior is thoroughly detailed around windows, awnings, etc.
11. *Clean up job site*
12. *Final Inspection* – to homeowner's satisfaction.

The applicant indicates his product is different from other permanent coating systems in the following ways:

- Rhino Shield is permeable and has been tested by BASF labs. *(The applicant explained in a subsequent email that, "a zero rating = non breathable. Their primer has water repellent in its ingredients resulting in a low permeance (less breathable yet still breathable) and a rate of 3.2-3.9. The ceramic coat has a perm rating of 24-32. This is compared to an oil base paint which ranges from a 14-22 and a latex paint which ranges from 20-40.")*
- 3M ceramics is the key filler ingredient; there are no plastic or vinyl additives.
- Rhino Shield allows a 2 coat application vs. a 3 coat application required with some other systems. *(However this information does contradict the corporate website which indicates it is a 3-coat process.)*
- Rhino Shield can be removed similar to any latex paint product. *(The applicant indicates his only experience with removing the product is from a metal garage door, but that a typical paint stripper could be used. He believes that the integrity of the wood will not be negatively affected by the removal of the product.)*
- Rhino Shield can be painted over with any latex paint product. *(However, the applicant indicates the 25-year warranty is void if this occurs.)*
- Architectural details can be maintained as Rhino Shield can be applied with a spray, roller or brush.

Additionally, the applicant notes their product has been used by the Historic Columbus Foundation (Columbus, GA) on the historic building in which their offices are located (see letter attached supplied by the applicant). Staff contacted the HCF executive director and learned the Rhino Shield was applied to the shutters and cornice of a historic masonry building in March 2010. The product was selected because an area donor was willing to pay for the coating system to be applied and there were no approvals required from any local architectural review board. The HCF director did indicate that they have had no problems with the product since application but she did experience some issues with the powerwashing aspect of the preparation work, in that the crew was initially using too powerful of a spray and was damaging and etching the wood material. This was corrected after she stopped the work and spoke with the supervisor and crew.

Research

Staff had limited success in finding 3rd party reviews of Rhino Shield or similar products. However,

- The Jan-April 2003 issue of "The Alliance Review," published by the National Alliance of Historic Preservation Commissions, included two articles that caution against the products without significant testing and are attached to this report.
- Staff contacted the Indiana Division of Historic Preservation and Archeology and found they are not convinced that use of this type of product conforms to the Secretary of the Interior's Standards which generally require reversibility of procedures that may have a negative effect on historic material for Historic Investment Tax Credit projects.
- "Preservation Briefs" published by the Secretary of Interior warn against the preparation approaches (hydro-blasting, caulking, waterproofing masonry) of historic materials required by the permanent coating products.
- Several historic organizations including the Connecticut Trust for Historic Preservation and the Michigan State Historic Preservation Office have issued policies or statements similar to this commission's recommending against the use of permanent coating products.
- Staff sought the painting industry's perspective on the coating product and how the industry feels typical paint products compare. Professional paint staff approached in a local paint store was not familiar with the Rhino Shield product and could not make a comparison, however a technical professional at Porter Paints corporate office commented (via phone) that while he also *was not* familiar with Rhino Shield that he had some concern with applying an elastomeric product to a wood substrate. He indicated he felt there would be issues with it blistering and not being flexible enough to accommodate wood contracting and constricting wood.

Additionally, counsel provided staff information regarding a 2005 lawsuit (*Amcoat Techs.,Inc. v. Sobierary*) in the Johnson County (IN) superior court system re: Rhino Shield. The homeowner was dissatisfied because the product blistered, peeled and chipped. The contractor claimed the product was defective and the manufacturer claimed it was misapplied. This case cited 6 other lawsuits in Indiana from other dissatisfied homeowners against Rhino Shield/Liquid Siding/Kryton/AmCoat/Ceramic Coat. Court records indicate the case was dismissed in 2007 following a settlement agreement.

Finally, staff conducted a visual review of nine properties in Indianapolis located in the Butler-Tarkington, Meridian-Kessler and Broad Ripple areas. These properties had the product applied between 2002 and 2010. Staff found the product to look and feel similar to paint, with a slightly more matte or flat appearance. There was no evidence of bubbling, peeling, cracking or other significant failure.

Herron Morton Place Preservation Plan

WOOD SIDING

"It is neither necessary nor, in many cases, desirable to remove all old paint from wood. Methods to accomplish total removal of paint can be damaging to the siding and should be used only with great care. The use of high pressure water blasting (over 600 psi), sandblasting, rotary sanding or a blow torch should be avoided."

"If replacement of siding is justified (partial or total) avoid using any material other than real wood with dimensions, profile, size and finish to match the original. Hardboard, plywood, aluminum, vinyl or other synthetic or unnaturally composed materials do not look, feel, wear or age like the original and therefore should be avoided."

MASONRY

"Waterproof and water repellant coatings should be avoided. They are generally not needed and can potentially cause serious damage to the masonry."

Beyond these statements Herron-Morton's plan, adopted in 1986, does not address permanent coatings. However, it is important to note that several more recent preservation plans for nearby historic districts specifically recommend against permanent coating systems, noting that their make-up is different than traditional paint and due to their recent introduction into the market their durability, resilience and "repairability" remains uncertain.

Staff Position

While modern paint has evolved from the kind of paint available in the 19th c., it still performs essentially the same way, visually and functionally. Staff remains unconvinced that "Rhino Shield" and similar products do the same. Given the product's stated properties, it may be more akin to artificial siding that just happens to be sprayed on rather that nailed on. Staff has great concerns about the potentially huge financial and physical costs to a historic building if the product someday fails or problems with the underlying wood arise. Therefore, staff continues to find the product inappropriate and recommends denial for the following reasons:

1. The preparation of the home's exterior for receiving Rhino Shield requires hydro-blasting, extensive caulking, and in some instances, waterproofing masonry foundations -- all approaches with historic materials that we routinely recommend against or require extreme caution in pursuing.
2. The goal of the extensive preparation work is to seemingly make the building water tight. This seems to be an unreasonable expectation and will likely be detrimental to the building's ability to shed water that undoubtedly will find a way in. Additionally the primer, applied directly to the prepped wood surface has a very low permeance rating. While the applicant indicates this product is permeable, it appears the finish coat may be similarly permeable in comparison to an oil or latex paint, but with the adhesive primer, staff is not convinced that water won't be trapped and cause the structural members to begin rotting and decaying.
3. The product website indicates it bonds permanently to the substrate, seemingly altering the historic material. While the applicant indicates this is not the case, staff finds the adhesive factor of the Rhino Shield primer to be one of the major factors separating this product from typical paint and is not convinced that the product can be fully removed (primer/sealer and finish coat) without damaging the siding.
4. While the product has been around in some form for several decades, it has only recently been widely marketed, and staff could not locate any studies documenting the long term performance and effects of the products applied to historic materials.
5. Recently adopted preservation plans for two other IHPC historic districts specifically recommend against permanent coating products that have the following characteristics:
    a. Bonds to the historic material and cannot be removed without damage to or the removal of the historic material.
    b. Has a thickness greater than the ordinary exterior paint thickness of 4 mils, thereby obscuring architectural details, changing the visible profile, and/or limiting the vapor permeability.
    c. Requires the caulking or sealing of historic boards.
    d. Will not accept future applications of paint.

STAFF RECOMMENDED MOTION

2010-COA-169 (HMP):

To deny a Certificate of Appropriateness for the use of a ceramic coating system on exterior siding and trim.

Staff Reviewer: Amy L. Bear

Looking north at the intersection of 20th and Delaware Streets

Front/West elevation – 2001 N Delaware

South elevation – 2001 N Delaware

Example of some peeling and flaking of paint on front elevation

This Old Column

December, 1999

Paint vs. Permanent Coating Systems

A new product has been introduced to our historic districts. Permanent coating systems are liquid exterior coatings that are advertised as an alternative to traditional paint products. These systems claim to reduce your home's energy costs, eliminate peeling and cracking, and last forever by coating the surface of the home with liquid plastic. The result is a product that bonds to the historic materials of your home and cannot be removed without the removal and replacement of the historic siding.

Because the use of these products appears to result in a permanent alteration to the material on which the product is applied, IHPC staff has determined that the use of permanent coating systems within our historic districts is inappropriate. Staff is now adding a stipulation to all staff approved Certificates of Appropriateness for painting which make it clear that approval to paint does not include approval to use a permanent coating system. Use of permanent coating products would require Commission approval at a public hearing. If you have any questions about our policy please contact our offices at 327-4406.

"New" Coatings-- TestingMethodology/ Concerns

staff has provided the underlines

Get all the product information you can, starting with the MSDS sheet and the company's technical spec sheets for product selection and application. Give the information to a good physical chemist familiar with paint and coatings, and to a good currently-working house painter. Get reactions, in writing.

Get samples:
(a) of the coating material, preferably in colors which are as close as possible to those from the Munsell colors which have been called out by professional paint experts in the preservation field as good matches to historic colors; and

(b) of old weathered substrates of the sort we "preserve," e.g., clapboards (known age and some old paint still adhering would be preferable), old cast iron fencing or cresting, old brick with some paint on it and without paint--real preservation world substrates. Note the frequent claims that the product is great on anything.

Apply the material to each weathered substrate (not to fully cover), with a piece of masking tape as a dividing strip. Apply some regular house paint (maybe top grade acrylic latex in a gloss or semi-gloss, using the same color) beside the coating being evaluated. This will give at least a visual comparison. Does the coating dry to a hard plastic look, or do a few brush strokes show? Do spray applications obscure desirable detail or emphasize surface flaws? How about reflectivity--harsh when hit by full sun?

Ask a knowledgeable testing laboratory to cut a cross-section of the sample material in relationship to each coating. How thick is the coating layer (the "build")? How well adhered to whatever is beneath it (does the coating simply lift off, or stick tightly)? There are numerous ASTM paint and coatings performance criteria which could be checked.

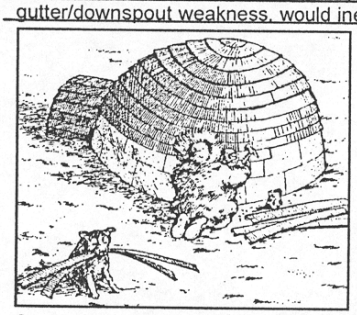
If the new product appears to be acceptable in every respect, you might then get the lab to do carefully controlled applications, and put all into a weathering chamber (sun, rain, wind-driven fine abrasive and corrosive particulate pollution, acid rain, etc.).

These testing methodologies and concerns are offered by Sara B. Chase, preservation consultant. Ms. Chase authored Preservation Brief 28: Painting Historic Interiors, in cooperation with Technical Preservation Services, NPS. This is her general guidance on assessing new coatings.

Concerns
Here are some concerns or warning flags frequently encountered with "new" coatings at least with respect to old (historic) structures:

Specifications that state, "Clapboards must be sealed, caulked, to fit tightly together": In fact, for clapboard buildings in northern climates, we advise strongly that any caulking along the bottom edges of clapboards be removed. The old wood has a coefficient of thermal and moisture expansion that must be respected, if you want the paint and the wood to have a useful service life.

Specifications that state the entire coating system "requires three coats", particularly if the first is said to be a waterproof coat: A "breathable" waterproof coat is questionable in practical application. Often, the system is geared to preventing water or weather (wind-driven particles, e.g.) from getting to the wood beneath the coating. This just can't be done with old buildings. And if it were to be done, the building might begin to decay from the micro-organisms which would be sealed into dark warm spaces--into which water from internal plumbing or heating malfunctions, or the odd gutter/downspout weakness, would inevitably come.



"A tribute to vinyl siding"

Reproduced from David Macaulay's *Great Moments in Architecture*, 1978, Houghton Miiflin Company

Consideration of the surface appearance. Are the films indeed so thick they obscure fine details? Brush-mark texture? Control of gloss level? And, with spray application, the ability to get to every minute change of plane? (Already far too many painters do not paint corner boards, or window and door trim so that the full profile of the trim wood is painted the trim color. They bring the clapboard or stucco color up the sides--or return--of the trim backbands or mouldings, making the trim look two-dimensional.)

If the coating is too thick, no matter how good the resins (oil, epoxy, acrylic), it cannot perform flawlessly on older substrates. The resulting problems, then, are sure to be harder to solve in a cost-effective way.

Final Advice
Always "spec" that you must watch the person who will be doing the work; do a substantial sample on an area that includes the trickiest trim; and require in the spec that the same person, the one you watched and approved, do the entire job. Generally, it is very good to have the client, the architect, the general contractor, and the immediate boss of that application person there on the site watching. I often document the sample job with very clear and close as well as distant photos, and ask that the client or architect sign off on the sample with the proviso that any subsequent work that does not look like the approved work must be redone at no cost to the client.

Liquid Siding - The Latest "Miracle Product"

Staff has provided the underlines

By Teresa Douglass and Phil Thomason

Liquid Siding is the latest miracle product on the market which claims that you will "never have to paint your house again." Advertising and marketing for this product have been concentrated in the Southeast, and promotion of this product is spreading nationwide. Questions have been raised recently about liquid siding that make use of the product debatable particularly on historic homes. Manufacturers and dealers of the ceramic-based coating claim that it provides a minimum of 25 years of maintenance-free protection and can save owners up to 40% on energy costs. Recent studies, however, reveal that the product might not be all that it claims to be.

The product is manufactured by Kryton International Inc., of Vancouver, British Columbia, and is distributed in the United States by Kryton Coatings International in Knoxville, Tennessee. Formally known as Multi-Gard R-20, liquid siding is applied by independent dealers under the name ProCraft. The siding is a thin ceramic based coating that is applied in a three-coat process, each of which is sprayed on. A sealer is followed by a second insulating coat, which contains ceramic platelets and volcanic perilite. Ads for the product compare this "space-age NASA technology" to that used on the space shuttle and claim that it provides insulation equal to seven inches of Fiberglass batting. The third or top coat is said to be a coating developed for Canadian Coast Guard Lighthouses to withstand extreme weather conditions. Cost of the application averages over $10,000 for a residence.

The product is touted as the most durable siding option available and is guaranteed not to chip, crack, blister, or peel for 25 years. The manufacturer claims that liquid siding eliminates the need to paint and its "super insulating 'Ceramic Microspheres'" provide sufficient insulation to reduce energy consumption up to 40 percent. The product can be applied to practically any surface, is custom tinted, and is "guaranteed to look freshly painted everyday, for the next 25 years." Independent lab tests are quoted as proof of these claims.

However, in October 2000, the Nashville Tennessean reported that the U.S. Department of Energy's Oak Ridge National Laboratory reviewed two of these tests and found that neither demonstrated that the product had significant insulation properties. One test did not comply with recognized national standards. The other test was actually done on another product, and in the report a decimal was misplaced, which made for a substantial overstatement of the product's insulating ability. The report mistakenly states that the product has an insulating value of R-24, but in actuality the value is R-0.024 or about the same insulating value as a piece of linen cloth.

Oak Ridge lab officials have contacted the Federal Trade Commission's Division of Enforcement to suggest that it obtain documentation to support Kryton's claims of superior insulating qualities. The Better Business Bureau of Middle Tennessee has also requested information to substantiate these claims. Those that have used the product have varying opinions of its performance. The Seattle Housing Authority used liquid siding on one of its buildings in 1978 and has since had to paint two or three times because the Kryton product had begun peeling off in sheets. Canadian Coast Guard spokespersons also note that lighthouses coated with the product also were repainted in recent years. Several Tennessee homeowners who have recently used the product, however, are pleased with the product so far.

Regardless of its insulating quality, liquid siding is not recommended for use on historic buildings. Louis Jackson, tax credit coordinator at the Tennessee Historical Commission, states that the product is inappropriate for a number of reasons. Foremost, the product is non-reversible; it cannot be removed without damaging the historic fabric of a building. The application process itself is also damaging as it requires sandblasting, which causes further damage. Therefore, the Tennessee Historical Commission does not recommend the use of liquid siding on historic buildings. Because of the sandblasting requirement and questionable adhesion properties, the use of liquid siding is not appropriate for historic properties.

Phil Thomason has been Principal of Thomason and Associates, Preservation Planners since 1982. They are based in Nashville and provide preservation services throughout the country. Teresa Douglass is a Preservation Planner with the firm and has worked with them since 1998. They regularly work with Preservation Commissions on design guidelines, training and workshops, and overall community preservation plans.

THE REMAINING INFORMATION & PHOTOS ARE ALL PROVIDED BY THE APPLICANT

Work to be Performed

Apply Rhinoshield Ceramic Coating to residence located at 2001 North Delaware Street, Indianapolis, Indiana. This home is located in the Herron Morton Place neighborhood.

The application of Rhinoshield will involve:

Preparation – pressure wash the exterior surface, hand scrape all loose dirt and chipped/peeling paint. Inspect for any rotted wood and replace with similar material. Caulk around windows, doors, and any cracks or crevices. Mask and shield any areas near the work area for protection.

Apply Primer – Spray, roll, or brush Adhesive Primer Sealer (APS) to all surfaces to be painted. This application is white in color when applied but dries to a clear appearance. It has a one hour dry time above 50 degrees.

Apply Ceramic Paint - Spray, roll, or brush the ceramic finish coat (CFC) in the color of choice to all surfaces to be painted. This has a four hour dry time.

Clean Up – Removal of all job related debris. Provide client with ample supply of product for any touch ups.

We are aware of the Commission's stance on the appropriateness of "permanent coatings". After reviewing those products, I understand the decisions that were properly made regarding those products. Rhinoshield is a product that is comprised of different raw materials resulting in different properties and different features and benefits.

Rhinoshield is a water-based (latex) paint that has eliminated all of the non functional fillers in common in less expensive, less effective paints. This formulation uses only the highest quality additives – 100% acrylic resin, titanium dioxide, and 3M ceramic

microspheres. The product is 57% solids by weight. Many retail paint companies are now offering ceramics as an additive for their paints to improve the performance.

The uniqueness of Rhinoshield is in its permeability. It is highly resistant to water penetration yet vapor and gasses are allowed to escape. Houses are allowed to "breathe" reducing moisture and/or mold issues. Rhinoshield has been tested by BASF labs verifying this unique property.

Rhinoshield has been the product of choice for many highly respected companies. In 2003, the NASCAR wind tunnel was done. In 2007, Firestone began having its retail tire centers painted. In 2008, Disney chose Rhinoshield for its Mona Lisa Resort. In 2009, the Historic Columbus Foundation located in Columbus, Georgia, chose Rhinoshield to paint the historic building their offices are located in. Elizabeth Barker has agreed to be available as a reference and for questions. She can be reached at 706.332.3214.

Variances in Rhinoshield vs. Permanent Coatings

Manufactured in USA since 1977, Manufacturer originated in 1964.

Permeable – tested by BASF labs

No plastics or vinyl additives, 3M ceramics is key filler ingredient.

2 coat application (prime/paint) vs. 3 coat application (excess buildup)

Can be removed similar to any latex paint product

Can be painted over with any latex paint product

Architectural details can be maintained (applied with spray, roll, or brush)

Tri-State Coatings, Inc. (Rhinoshield dealer/painting contractor) is an accredited member of the BBB since 2003 and has an "A" rating with Angie's List.

Builders Association of Greater Indianapolis — Where the Quality Standards are Set.

(317) 578-7490
(317) 578-7497 – fax
888-RHINO41

Rhino Shield

By Tri-State Coating, Inc.

www.rhinoshield.net

BBB

Name	MARGARET LEHTINEN / LAWRENCE MARK	Date	3-30-09
Street	2001 N. DELAWARE ST.	Home Phone	317-531-3431
City/State/Zip	INDPLS, IN 46202	Work Phone	317-332-5310 LAWRENCE CELL
Sales Representative	Rich Thompson		

25 yr Ceramic Coating System
APS – Adhesive Primer Sealer
CFC – Ceramic Finish Coat

CALL LAWRENCE
ON NOON FRI

[redacted]

	No.	NOT INCLUDED	INCLUDED		color
PREPARATION:	1.	❑	✓	Inspect surfaces in work area Prep all surfaces to be painted.	
	2.	❑	✓	Pressure-wash all surfaces in work area to be covered, to remove loose debris.	
	3.	❑	✓	Caulk and seal as necessary in areas to be painted.	
	4.	❑	✓	Mask and shield all windows, doors, roofs, lawn, shrubs, decking and patios to prevent over-spraying.	
	5.	❑	✓	Mask or remove all exterior appliances and reinstall upon job completion.	
				Spray, Roll or Brush product to the following areas	3 Colors QTD
AREAS:	6.	❑	✓	Walls & Gables	
	7.	❑	✓	Soffit	
	8.	❑	✓	Fascia	
	9.	X	❑	Shutters	
	10.	❑	✓	Columns	
	11.	❑	✓	Porch Ceilings FRONT/BACK	
	12.	❑	✓	Porch Rails FRONT/BACK	
	13.	X	❑	Chimney	
	14.	X	❑	Foundations	
	15.	❑	✓	Other Areas GUTTERS & DOWN SPOUTS	
WINDOWS:	16.	❑	✓	Window Frame Only – Total 34/ALL	
	17.	X	❑	Window Frame & Sash – Total	
	18.	X	❑	Window Frame, Sash & Grids – Total	
DOORS:	19.	❑	✓	Door Frames – Total 3	
	20.	❑	✓	Door Bodies – Total 3	
	21.	X	❑	Garage Door Frames – Total ___ GD. Bodies – Total ___	
CLEAN-UP:	22.	X	✓	Clean up & removal of all job related debris.	
	23.	❑	✓	Each job is over-shipped to avoid delays. Remove excess materials and restock.	
WARRANTIES:	24.	❑	✓	Warranties will be mailed out in 30-45 days after completion.	
	25.			WORK TO COMMENCE ASAP. COMPLETION WILL BE WITHIN 10 DAYS WEATHER PERMITTING	

RECEIVED
INDIANAPOLIS HISTORIC PRESERVATION COMMISSION

SPECIAL: CONTINGENT ON INDPLS HISTORIC PRESERVATION COMMISSION APPROVAL
CUSTOMER MAY WANT TO DO HOUSE IN TWO STAGES
THIS AGREEMENT IS GOOD UNTIL JUNE OF 0-11

WORK NOT TO BE DONE: window frame/sash repair, door jam/threshold repair PORCH FLOORS

Materials Change $2.60 per Lin Ft for Wood Replacement [illegible] Repairs

Any extra work requested by the Customer may be performed by Tri-State Coating upon mutual agreement of the price for such work.
Surfaces may not be restored to "smooth" appearance. Tri-State Coating will utilize its best effort to prepare the surface for application.
Any unforeseen exterior rotten wood will be replaced at an additional charge.

The Price Agreed Upon For This Work Is:		Signature [signature]
		Print Signature RICK THOMPSON
Cash Price	$ 25674	Signature [signature]
Down Payment	(10%) $ 2567	Print Signature LAWRENCE A. MARK
Draw Payment	(50% above 15,000) $ 11553	Signature [signature]
Due on day of Completion	$ 11553	Print Signature MARGARET E. LEHTINEN

RhinoShield

April 2010 www.rhinoshield.net

Mold and Mildew

We are proud to announce a significant upgrade on the top-coat concerning mold, mildew, and algae prevention. Until now we have formulated with a mildewcide and a zinc additive to counter mildew. This has worked better than standard paint but wasn't perfect.

The new method incorporates a brand new EPA registered product. The product consists of three sep-arate active ingredients. The first is a mildewcide, the second is a fungicide, and the third is an algaecide. The algaecide actually stops photosynthesis.

Another advantage to this three-component cocktail is it isn't very toxic. Products like this are rated a one, two, or three toxicity category. A one is labeled as "Poison" with a skull and crossbones, a two is labeled as "warning", and three is labeled as "caution". This is a level three toxicity labeled as "caution" so it is as safe as can be expected for something that kills mold, mildew, and algae, and is line with our position to be as "green" as possible.

Mike Redmond and Kevin Mmahat have been testing this formulation for six months. New Orleans and the gulf coast is the most challenging mold and algae environment we encounter. It is wet, hot, and below sea level. Both Kevin and Mike report the new formulation is a nice improvement and is working in their market. Now this improvement will be available to everyone and from this point forward the top-coat will automatically include the three part upgrade.

We are hesitant to list the product on our website. We believe this is an advantage no one else is utilizing. The concern is if we advertise the exact name of the EPA registered cocktail, others will copy and we will lose the uniqueness.

Pallet Update

Business continues to be better than last year. In fact through the first quarter of this year, orders are up over 50% from the same period in 2009. Through March 31st the top three Dealers are:

1. Gulf South	22 pallets
2. San Diego	14 pallets
3. Jacksonville	9 pallets

HGTV disappointment

We have been taken by HGTV. Our episode aired and there was no mention of Rhino-Shield. In fact they never even mentioned the house was stripped and painted. Although it doesn't make us feel better, many other contractors spent even more money and were not mentioned either. One contractor tore off the roofs and installed a copper roofing system and another company gutted the interior and completely redesigned the inside.

Our contract guaranteed at the very least we would be in the credits and a permanent link on the HGTV website, and neither happened. Our concerns have been expressed to the production company. They are offering to rework the program and include Rhino-Shield as the episode will re-air in June. Nothing is guaranteed yet. If they don't, we may pursue for breach of contract because we (and Susan) spend a lot of money and effort.

In the meantime feel free to use whatever you want concerning HGTV. Our coating was selected by HGTV and shown on national TV. Use their logo and let's make something positive out of this. We will be adding it to our website.

Features & Benefits of Ceramic Paints & Elastomeric Coatings

Interior and Exterior Ceramic Paints

- Trade Secret Mixture of Ceramic Microspheres and Ceramic Pigments
  - Increased Durability and High Scrub Resistance
  - Decreased Heat Transfer = Energy Savings
  - Additional Insulation Value = Energy Savings
  - Soundproofing Characteristics
- Quality Modified Acrylic and 100% Acrylic Resins
  - Waterproofing
  - Excellent Gloss Retention (Satin and Semi-Gloss Finishes)
- Easy Cleanup with Water while still Wet
- Safe for the Environment / Low V.O.C.
  - Less than 250 grams per liter of Volatile Organic Contents
- Mild Smell for Fewer Unpleasant Fumes and Odors
- Manufacturer Direct Pricing and Lengthy Manufacturer's Limited Material Warranty
- Excellent Touch Up (Safety Margin Ordering allows potential Touch Up Reserve for Customer)
- Latex Enamel Finishes provide Excellent Flow and Leveling for a Beautiful Uniform Finish
- Excellent Fade Resistance and Color Retention

Elastomeric Ceramic Coatings

- Trade Secret Mixture of Ceramic Microspheres and Ceramic Pigments
  - Increased Durability and High Scrub Resistance
  - Decreased Heat Transfer = Energy Savings
  - Additional Insulation Value = Energy Savings
  - Soundproofing Characteristics
- Quality Modified Acrylic Resins, 100% Acrylic Resins and Elastomeric Resins
  - Waterproofing
  - Excellent Gloss Retention (Satin and Semi-Gloss Finishes)
  - Expand & contract with hot & cold temperatures, and excellent resistance of Thermal Shock
- Easy Cleanup with Water while still Wet
- Safe for the Environment / Low V.O.C.
  - Less than 250 grams per liter of Volatile Organic Contents
- Mild Smell for Fewer Unpleasant Fumes and Odors
- Manufacturer Direct Pricing and Lengthy Manufacturer's Limited Material Warranty
- Excellent Touch Up (Safety Margin Ordering allows potential Touch Up Reserve for Customer)
- Excellent Fade Resistance and Color Retention
- Excellent Paint Film Breathability (Air & Water Vapor Pass Through, Water Does Not)
- Excellent Mold, Mildew and Fungi Resistance

Nationwide Chemical Coating Mfrs., Inc.

- Established in 1964 - Extensive Manufacturing Knowledge, Experience and Expertise
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- Integrity and Loyalty to our Customers
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NATIONWIDE CHEMICAL COATING MFRS., INC.

The *PERM*anent Coating Solution™

Product Composition Comparison

HOW NATIONWIDE's ELASTOMERIC CERAMIC HIGH SOLIDS/HIGH BUILD PROTECTIVE COATINGS STACK UP to OTHER COMPETITORS:

TYPICAL COMPETITORS COATING PRODUCT COMPOSITION

NO CERAMICS

NATIONWIDE's PRODUCT COMPOSITION*

NO CLAYS or EXTENDERS
NO PLASTICIZERS

TYPICAL COMPETITORS PAINT PRODUCT COMPOSITION

NO CERAMICS

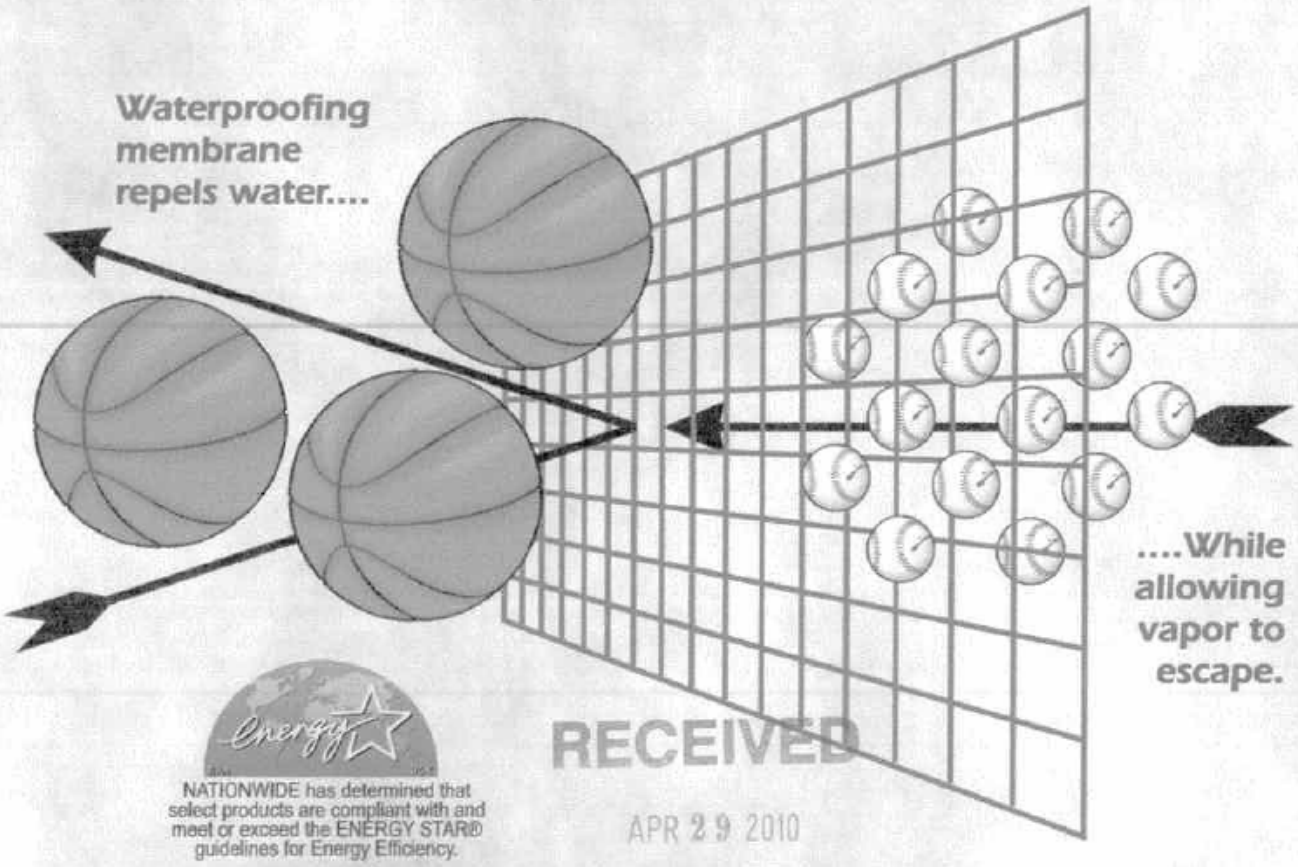
** Based on averages of*
ULTRA SEAL™, ULTRA KOTE XL™ & PERMAKOTE®

All information presented herein has been compiled from sources to be reliable, and is accurate and reliable to the best of our knowledge and beliefs, but is not guaranteed to be so. | *Revised: 09/03/05*

www.nationwidecoatings.com 1.800.423.7264 or 941.753.7500 e-mail: info@natcoat.net

BREATHABILITY OF OUR ELASTOMERIC COATINGS

Breathability is a topic many paint manufacturers don't talk about. If the product can't breathe, then it will fail; it's just a question of when. Take a few minutes to learn about this important feature of Nationwide's Elastomeric Ceramic Roof and Wall Coatings.



NATIONWIDE has determined that select products are compliant with and meet or exceed the ENERGY STAR® guidelines for Energy Efficiency.

WHAT IS THE PERM RATE?

Basically, a perm rate is the length of time, in seconds, it takes moisture to pass through a square meter of membrane material. Nationwide's Elastomeric Ceramic Coatings are highly resistant to water penetration, yet they allow vapor to escape.

This diagram illustrates the coating membrane (the mesh), the size of water in liquid form (the basketballs) and the size of water as a vapor (the baseballs). This graphic is not representative of actual liquid and vapor particulate sizes; the actual ratio is more dramatic at 1600:1 (liquid water vs. water vapor).

Permeability is critical to long life in a coating. Trapped water and condensation in non-permeable coatings are leading causes of product failure as well as contributing factors in the growth of mold and mildew.

TESTING DATA

Laboratory Report

AmCoat Industries, Inc.

Rhino Shield Coatings

11/11/04

CON 04-173 Project

ASTM D 6083-97a

Physical Property	ASTM Test	Requirement	Rhino Shield DFC-W	Rhino Shield APS
I Colloidal properties				
Viscosity (KU)	D 562	85-141	105.3	99.9
Viscosity (Brookfield LVT #4 @ 6 rpm)	D 2196	12-85 poise		
Volume solids (% calculated)	D 2697	>50		
Weight solids (%)	D 1644	>60	57.1	35.7
II Mechanical properties of the film Tensile-elongation testing conditions: (1/2" sample width, 1" jaw separation, 1"/minute speed of pull)				
A. After 14 days drying in standard lab conditions				
Tensile strength[1] @ 73°F	D 2370	>=200 lb/in^2	377	65
Elongation[1] at break @ 73°F	D 2370	>=100 %	398	2642
B. After 1000 hours aging in a Xenon Arc Weatherometer				
Elongation[1] at break @ 73°F	D 2370	>=100 %	139	2279
Accelerated weathering (cracking & Checking)	D 4798	Nil	Nil	Nil
III Other properties of the film				
Wet Adhesion[2] -Polyurethane foam	C 794/ D 903	>2 lb/in	0.11	0.89
Wet Adhesion[2] -Galvanized	C 794/ D 903	>2 lb/in	3.40	3.92
Tear Resistance[1] (Die C)	D 624	>60 lbf/in	133.0	29.1
Permeance[2]- Inverted	D 1653A	<50 perms	32.7	3.2
Permeance- Upright	D 1653A	NR	24.3	3.9
Water swelling[1]	D 471	<20 weight %	11.9	37.6
Fungi resistance	G 21	Zero	ND	ND
IV Other non-required test results				
Dry Adhesion[2] -Polyurethane foam	*C 794/ D 903*	*NR*	1.40	3.20
Dry Adhesion[2] -Galvanized	*C 794/ D 903*	*NR*	10.42	4.40

NT = Not tested *NR = Not required* [1] Only three specimens tested [2] Only two specimens tested.

BASF Corporation
Charlotte Technical Center
11501 Steele Creek Road
Charlotte, North Carolina 28273
(704) 588-5280
800-395-5152

BASF

PRA COATINGS TECHNOLOGY CENTRE

Testing Paints for Resistance to Weathering

Scope and Field of Application

These tests are designed to measure the effect of sunlight, moisture and temperature on surface coatings applied to a variety of substrates. If you are more concerned with the way that surface coatings protect substrates from corrosion, please refer to our Corrosion Resistance tests.

It is important to realise that the tests listed here provide comparative rather than absolute data. They will, for example, indicate whether Paint A has better weather resistance properties than Paint B. What is often required however is a report that states, for example, "The test results prove that Paint A will provide effective protection for at least 10 years when exposed in Southern Europe."

In order to obtain this type of absolute data, the client needs to supply a Reference Paint which, in the case of the above example, is known to provide effective protection for at least 10 years when exposed in Southern Europe. The Reference Paint should also be as close as possible in composition to Paint A. The procedure then is to run the test on both paints until one fails. If, for example, the Reference Paint fails first, our report would say " The test results indicate that Paint A will provide effective protection for at least 10 years when exposed in Southern Europe."

It must be emphasised that laboratory tests can (and do) provide misleading predictions regarding the weather resistance of paints in the real world. In practice manufacturers of exterior paints rely heavily on records of how their products perform in service. This information is supplemented by data obtained from test panels exposed at various locations throughout the world. This combination of service life and test panel exposure data then serves as a means of checking the reliability of laboratory test results.

In one respect exterior paint manufacturers become the victims of their own success, since the longer the service life of the products they develop, the longer it takes for them to obtain in-service performance data. It is for this reason that they place increasing reliance on the predictive ability of laboratory tests.

Test Methods

We can carry out the following tests:-

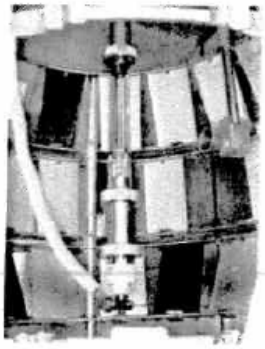
TEST	STANDARD
Artificial Weathering: Carbon Arc	BS 3900-F3 (obsolete)
Artificial Weathering: Fluorescent Lamp	ASTM G 154, BS EN ISO 11507, BS 3900-F16
Artificial Weathering: Plasma Erosion	In-house method
Artificial Weathering: Xenon	Arc BS EN ISO 11341, ISO 12040
Assessment of Lightfastness	Numerous
Controlled Temperature and Humidity Exposure	Numerous
Natural Weathering	BS 3900-F6
Resistance to Temperature Change	ASTM D 1211
	BS 3900-G 5, ISO 2812-1
Resistance to Water Immersion	BS 3900- G 8, ISO 2812-2

Artificial Weathering using a Xenon Arc Source

BS EN ISO 11341
ISO 12040

COATINGS TECHNOLOGY CENTRE

Scope and Field of Application
BS EN ISO 11341 is a method of determining either the lightfastness of paint films and allied materials or their resistance to artificial weathering. It aims to replicate the degradation caused by sunlight (either direct or through window glass) and rainfall.



ISO 12040 is a method of determining the lightfastness of printed material, printing inks and substrates (paper, board, metal and plastic) used in printing processes

Like all laboratory tests, the methods described here have their advantages and limitations and these are summarised, in general terms, on our Testing Paints for Resistance to Weathering page.

The xenon arc source, when used in conjunction with appropriate filters, is generally regarded as giving the closest approximation to natural sunlight that can be obtained in the laboratory. The equipment also allows for a greater degree of control of temperature, humidity and radiation dose than is possible with other forms of accelerated weathering.

The main disadvantages of the xenon arc method are:-

- it is one of the most expensive weathering tests.
- the test samples have to be flat and there are limitations on the size of samples that can be tested.

The main advantage of the xenon arc method is that it gives the best correlation with natural weathering.

An alternative and less expensive method of measuring lightfastness involves the use of a fluorescent lamp weatherometer. Please refer to our lightfastness testing page for details.

The fluorescent lamp weatherometer can also be used as a cheaper artificial weathering method. Details can be found on our fluorescent lamp test page

Test methods that use the xenon arc or fluorescent lamp weatherometers require samples to be submitted in the form of test panels. If you need to test larger objects you may also wish to consider the advantages and limitations of the enclosed carbon arc method.

There are no pass/fail criteria defined in the standard. This is a matter of agreement between the parties concerned.

The actual standards are copyright-protected documents and we are not able to provide you with copies. If required however, you can easily obtain copies from the British Standards Institution or The International Organisation for Standardisation.

Summary of Methods

The same equipment is used for both methods. It consists of a chamber in which test samples are mounted on a circular carousel which rotates around a xenon arc lamp. A number spray nozzles are positioned in the chamber so that, if required, they can wet the test surfaces of the panels. The parameters that can be controlled and monitored include black panel temperature, humidity, irradiance, light-dark periods and wet-dry periods.

BS EN ISO 11341
The standard defines four different operating conditions, two for lightfastness testing and two for resistance to artificial weathering. The lightfastness testing is carried out dry using optical radiation filters equivalent to terrestrial solar radiation through 3 mm thick window glass. Artificial weathering testing is carried out using wet / dry cycles and optical radiation filters which transmit a spectral range close to that of terrestrial solar radiation.

ISO 12040
The standard defines one set of operating conditions which are used to measure the lightfastness of printed material, printing inks and substrates. A pane of plate glass is placed between the light source and the test piece. The thickness and composition of the pane is such the it absorbs all wavelengths below 310 nanometres and has at least 90% transmission between 380 and 700 nanometres. The intention is to simulate the effect of sunlight through window glass.

The sample is exposed until it has undergone a distinct colour change. Blue Wool Scale standards are exposed at the same time. At the end of the exposure period the Blue Wool Scale standards are examined in order to determine which one has faded to the same extent as the sample. The Blue Wool scale is made up of eight standard ranging in lightfastness from Number 1 (very poor) to Number 8 (outstanding).

Sample Requirements

These are the same for all methods.

We require 150 x 75 mm samples not more that 5 mm thick. If you have smaller samples, you can fix them to 150 x 75 mm panels provided the overall thickness does not exceed 5 mm.

We recommend that samples are run in triplicate.

COMMERCIAL TESTING COMPANY
Post Office Box 985 • 1215 South Hamilton Street • Dalton, Georgia 30722
Telephone (706) 278-3935 • Facsimile (706) 278-3936

Standard Method of Test for
Surface Burning Characteristics of Building Materials

ASTM E 84–03b

Rhino–Shield Durable Finish Coat (DFC)

Report Number 04–08329

Test Number 3592–2192–A
August 19, 2004

AmCoat Industries, Inc.
Niceville, Florida

Commercial Testing Company is accredited for the ASTM E 84 test by the United States Department of Commerce, National Institute of Standards and Technology (NIST), through the National Voluntary Laboratory Accreditation Program (NVLAP) for compliance with criteria set forth in NIST Handbook 150:2001, all requirements of ISO/IEC 17025:1999, and relevant requirements of ISO 9002:1994.

Commercial Testing Company

Jonathan Jackson

(Authorized Signature)

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Since 1974

INTRODUCTION

This report is a presentation of results of a surface flammability test on a material submitted by AmCoat Industries, Inc., Niceville, Florida.

The test was conducted in accordance with the American Society for Test and Materials fire test response standard E 84–03b, *Surface Burning Characteristics of Building Materials*, sometimes referred to as the Steiner tunnel test. This test is applicable to exposed surfaces such as walls and ceilings. The test is conducted with the specimen in the ceiling position with the surface to be evaluated exposed face down to the ignition source. The method is the technical equivalent to NFPA No. 255 and UL No. 723.

This standard is used to measure and describe the response of materials, products, or assemblies to heat and flame under controlled conditions, but does not by itself incorporate all factors required for fire–hazard or fire–risk assessment of materials, products, or assemblies under actual fire conditions.

PURPOSE

The purpose of the test is to provide only the comparative measurements of surface flame spread and smoke development of materials with that of select grade red oak and reinforced cement board under specific fire exposure conditions. The test exposes a nominal 24-foot long by 20-inch wide test specimen to a controlled air flow and flaming fire adjusted to spread the flame along the entire length of a red oak specimen in 5.50 minutes. During the 10-minute test duration, flamespread over the specimen surface and density of the resulting smoke are measured and recorded. Test results are calculated relative to red oak, which has an arbitrary rating of 100, and reinforced cement board, which has a rating of 0.

The test results are expressed as Flame Spread Index and Smoke Developed Index. The Flame Spread Index is defined in ASTM E 176 as "a number or classification indicating a comparative measure derived from observations made during the progress of the boundary of a zone of flame under defined test conditions." The Smoke Developed Index, a term specific to ASTM E 84, is defined as "a number or classification indicating a comparative measure derived from smoke obscuration data collected during the test for surface burning characteristics." There is not necessarily a relationship between the two measurements.

The method does not provide for measurement of heat transmission through the surface tested, the effect of aggravated flame spread behavior of an assembly resulting from the proximity of combustible walls and ceilings, or classifying a material as noncombustible solely by means of a Flame Spread Index.

The zero reference and other parameters critical to furnace operation are verified on the day of the test by conducting a 10–minute test using 1/4–inch reinforced cement board. Periodic tests using NOFMA certified 23/32–inch select grade red oak flooring provide data for the 100 reference.

TEST SAMPLE

The test sample, selected by the client, was identified as **Rhino–Shield Durable Finish Coat (DFC)**, an elastomeric acrylic urethane coating. Three test panels, each measuring two feet wide by eight feet in length, were prepared by application of the material to 5/8–inch thick USG Firecode Type X gypsum wallboard. The coating was brush-applied in two coats to give a built-up nominal thickness of 2 mils. After drying overnight, the prepared panels were transferred to storage racks and conditioned to equilibrium in an atmosphere with the temperature maintained at 71 ± 2°F and the relative humidity at 50 ± 5 percent. For testing, the panels were placed end–to–end on the ledges of the tunnel furnace and tested with no auxiliary support mechanism.

TEST RESULTS

The test results, calculated on the basis of observed flame propagation and the integrated area under the recorded smoke density curve, are presented below. The Flame Spread Index obtained in E 84 is rounded to the nearest number divisible by five. Smoke Developed Indices are rounded to the nearest number divisible by five unless the Index is greater than 200. In that case, the Smoke Developed Index is rounded to the nearest 50 points. Flame spread and smoke development data are presented graphically in the computer print–out at the end of this report.

Test Specimen	Flame Spread Index	Smoke Developed Index
Reinforced Cement Board	0	0
Red Oak Flooring	100	100
Rhino–Shield Durable Finish Coat (DFC)	25	5

OBSERVATIONS

Specimen ignition over the burners occurred at 0.68 minute. Surface flame spread was observed to a maximum distance of 5.07 feet beyond the zero point at 1.35 minutes. The maximum temperature recorded during the test was 613°F.

CLASSIFICATION

The Flame Spread Index and Smoke Developed Index values obtained by the ASTM E 84 test are frequently used by code officials and regulatory agencies in the acceptance of interior finish materials for various applications. The most widely accepted classification system is described in the National Fire Protection Association publication NFPA 101 *Life Safety Code*, where:

Class A	0 – 25 Flame Spread Index	0 – 450 Smoke Developed Index
Class B	26 – 75 Flame Spread Index	0 – 450 Smoke Developed Index
Class C	76 – 200 Flame Spread Index	0 – 450 Smoke Developed Index

Class A, B, and C correspond to Type I, II, and III respectively in other codes such as SBCCI, BOCA, and ICBO. They do not preclude a material being otherwise classified by the authority of jurisdiction.

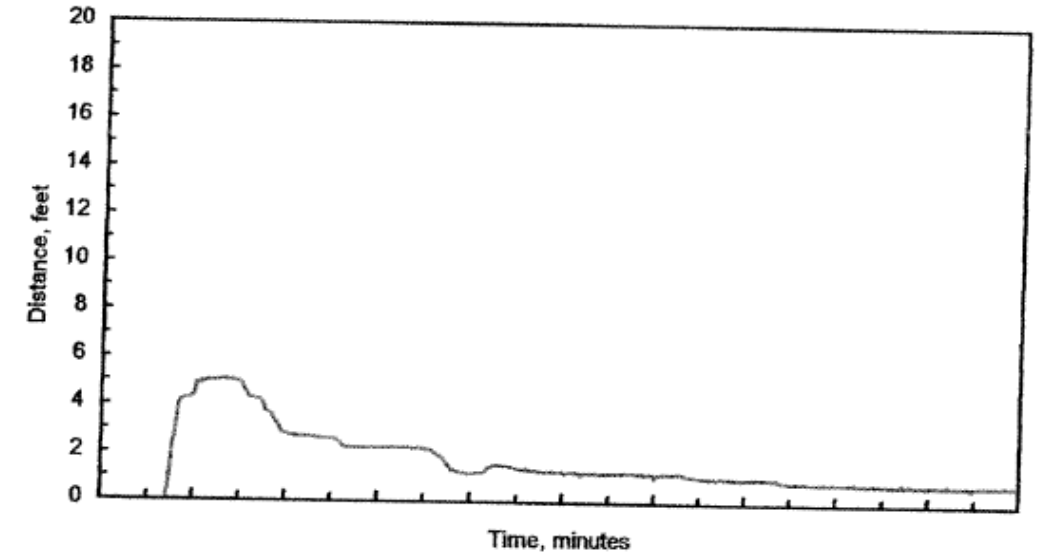
ASTM E 84 TEST DATA

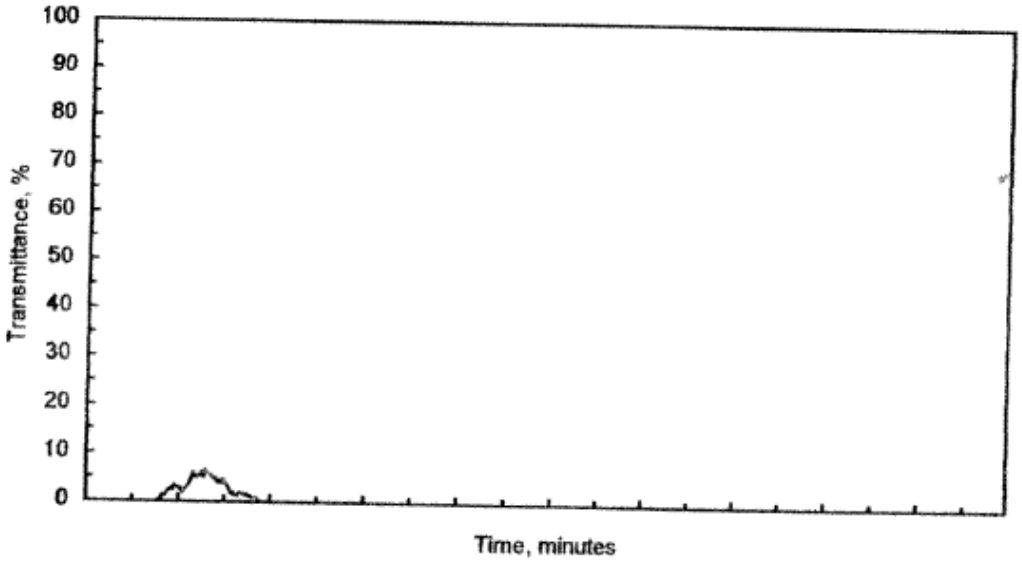
Client: AmCoat Industries, Inc.
Test Number: 3592-2192
Material Tested: Rhino-Shield (DFC)
Date: August 19, 2004

Test Results:

Time to Ignition	=	00.68 minutes
Maximum Flamespread Distance	=	05.07 feet
Time to Maximum Spread	=	01.35 minutes

Flame Spread Index	=	25
Smoke Developed Index	=	5





RHINO SHIELD COATINGS

PROJECT REPORT
Salt Spray (Fog) Testing ASTM B-117-97

Report #: 0901PFB, September 2001

1.0 SCOPE
This test method employs photographic reference standards to evaluate the degree of blistering that may develop when paint systems are subjected to conditions which will cause blistering. While primarily intended for use on metal and other nonporous surfaces, this test method may be used to evaluate blisters on porous surfaces, such as wood, if the size of the blisters falls within the scope of these reference standards. When the reference standards are used as a specification of performance, the permissible degree of blistering of the paint system shall be agreed upon by the purchaser and the seller.

2.0 SIGNIFICANCE and USE
A phenomenon peculiar to painted surfaces is the formation of blisters relative to some system weakness. This test method provides a standard procedure of describing the size and density of the blisters so that comparisons of severity can be made.

3.0 REFERENCE STANDARDS
The photographic reference standards are glossy prints. Figures 1 to 4 are reproductions of these standards and are included to illustrate two characteristics of blistering size and frequency.
Size -Reference standards have been selected for four steps as to size on a numerical scale from 10 to 0, in which No.10 represents no blistering. Blistering standard No.8 represents the smallest size blister easily seen by the unaided eye. Blistering Standards Nos. 6, 4, and 2 represent progressively larger sizes.
Frequency- Reference standards have been selected for four steps in frequency at each step in size, designated as follows:

Dense
Medium Dense
Medium
Few

4.0 TESTING PROCEDURE
The apparatus required for salt spray (fog) testing consists of a fog chamber, a salt solution reservoir, a supply of suitably conditioned compressed air, one or more atomizing nozzles, specimen supports, provision for heating the chamber, and necessary means of control. A scratch or scribed line shall be made through the coating with a sharp instrument so as to expose the underlying metal before testing. The salt solution shall be prepared by dissolving 5±1 parts by weight of sodium chloride in 95 parts of water.

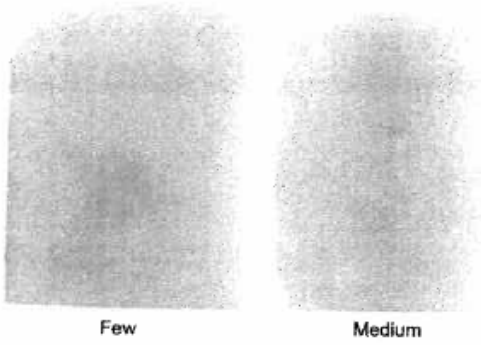
5.0 RESULTS

SAMPLES for TESTING: *(All Samples scribed prior to placing in salt fog apparatus)*		
Sample Identification:	**Observations After 1 Week**	**Observations After 3 Weeks (ASTM D 714)**
RHINO SHIELD APS, CMC and DFC Applied at Application Specifications to a Metal Plate (16 mils Dry Film Thickness)	**#8 Few at Scribe**	**#8 Few at Scribe**
COMMERCIAL CONTROL RUSTOLEUM GLOSS WHITE INDUSTRIAL OIL BASED HIGH PERFORMANCE ENAMEL	**#8 Medium at Scribe Slight Staining**	**#6 Medium at Scribe Staining**

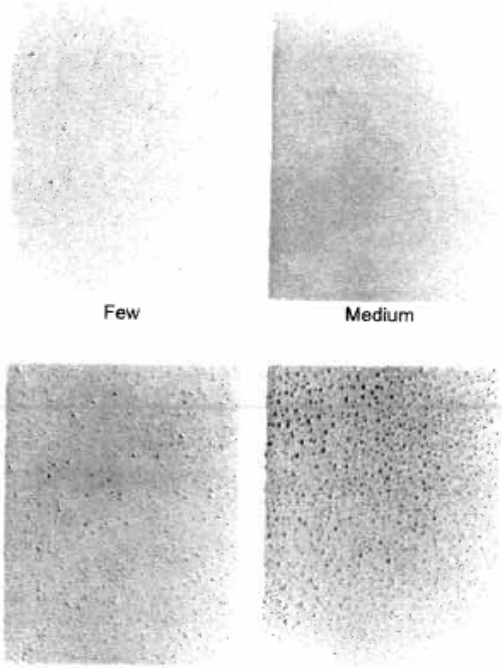
Pictorial Standards Of Coatings Defects
(Previously Published as "Exposure Standards Manual")

Compiled and Updated by
Philadelphia Society for Coatings Technology (Pictorials Standards Sub-Committee, R.C. Sonntag - Chairman)
In Conjunction with
Sub-Committee D 01.25 on Pictorial Standards of Coatings Defects (Stanley LeSota - Chairman)
Of the American Society for Testing and Materials.

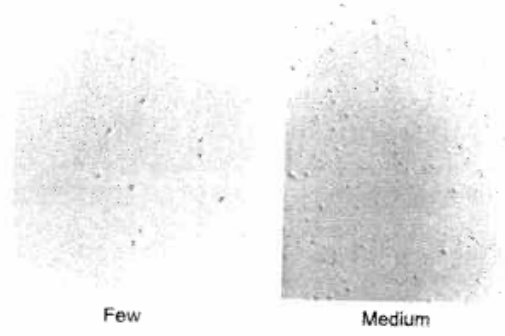
Federation of Societies for Coatings Technology
1315 Walnut Street, Suite 832, Philadelphia, PA 19107



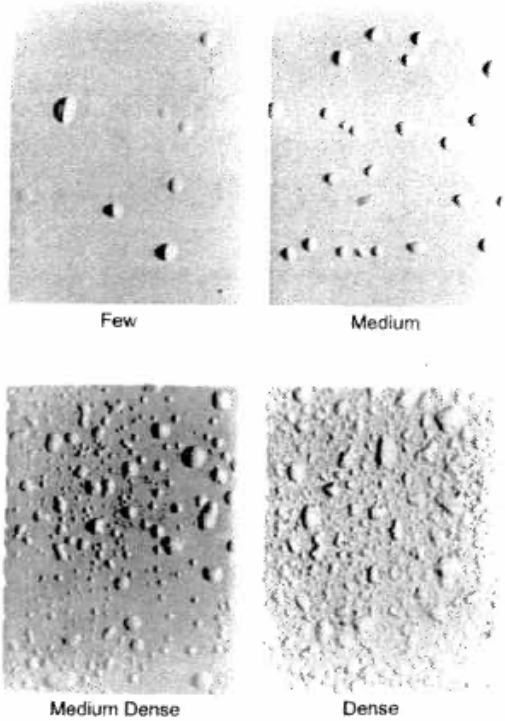
Blister Size No. 8



Blister Size No. 6



Blister Size No. 4



Blister Size No. 2

EMISSIVITY *and* INSULATION

Rhino-Shield qualifies as a "Low-e" coating. Low-e is short for low emissivity. A Low-e paint or coating will block heat from traveling outside to inside – or vice-versa. The U.S. Department of Energy recommends Low-e coatings for roof insulating and may soon begin recommending the same for all building sub-straights.

Radiant Barriers work by reducing heat transfer by thermal radiation. The emissivity is a number between zero (0) and one (1). The higher the emissivity, the greater the emitted radiation. The goal of a top insulating coating is to emit rather than absorb radiant energy.

Rhino-Shield has been tested as follows:

Near-Normal Emittance Calculated	.92
Hemispherical Emittance Calculated	.87

RhinoShield

3M

Microspheres

Thermal Conductivity Report

June, 1998

Increasing or decreasing thermal conductivity

The addition of 3M™ Microspheres to a resin system can increase or decrease thermal conductivity in parts and films. The change depends on the type and amount of microspheres used. This thermal control is in combination with other possible enhancements such as lighter weight.

Potential microsphere applications for thermal conductivity include the following:

- Potting compounds – protecting components from environmental heat.
- Floor tiles with feeling of warmth.
- Insulative pipe wrap to decrease heat loss.
- Refractory brick in furnaces for heat retention.
- Syntactic foam insulation.
- Cast polyester products with the warm feel of wood.

Test Parameters

The following report compares 3M™ Scotchlite™ Glass Bubbles K1 and K46, Z-light Spheres™ Ceramic Microspheres W1300, Zeeospheres™ Ceramic Microspheres G400 and W410 and calcium carbonate.

K1 – 0.125 g/cc true density with 30-120 micron size range.

K46 – 0.46 g/cc true density with 15-80 micron size range.

W1300 – 0.7 g/cc true density with 70-350 micron size range.

G400 – 2.4 g/cc true density with 1-24 micron size range.

W410 – 2.4 g/cc true density with 1-24 micron size range.

$CaCO_3$ – 2.7 g/cc true density with 2-48 micron size range.

RTV silicone and epoxy resins were used for commonality and workability.

General Electric's RTV silicone resin 615A cured with RTV 615B was mixed as follows:

1. Prescribed amount of resin and curing agent weighed and mixed in a 50 ml plastic beaker.
2. Proper amount of filler added and slowly mixed to reduce the air entrained.
3. Mixed material poured to the top of a round dish, 2" dia. x 1/4" deep. Cured overnight before removal.

Shell EPON™ 813 epoxy resin cured with 3072 was prepared in a similar manner to the silicone, but the epoxy/curing agent mix was allowed to thicken before pouring into the dish.

All samples were analyzed with an Anter Corporation Model 2021 Thermal Conductivity apparatus following ASTM-518 protocol.

Results

Test results in the charts on the back page show a linear trend when fillers are added to the resins.

Scotchlite Glass Bubbles reduced the thermal conductivity of both resins. This would be important, for example, in syntactic foam insulation. With Z-Light Spheres Microspheres thermal conductivity increased slightly, but is less than mineral fillers, a characteristic to consider for refractory brick. Zeeospheres Microspheres provide higher thermal conductivity when enhanced heat transfer is preferred.

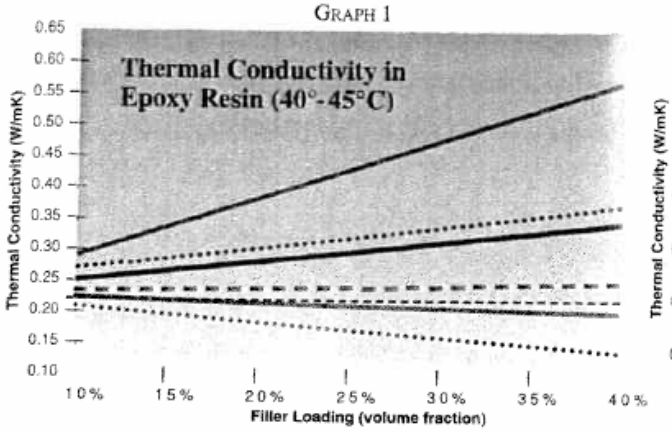
Results

Graphs one and two illustrate thermal conductivity trends for all materials. Graphs three and four present 3M™ Scotchlite™ Glass Bubbles and Z-light Spheres™ Ceramic Microspheres in greater detail.

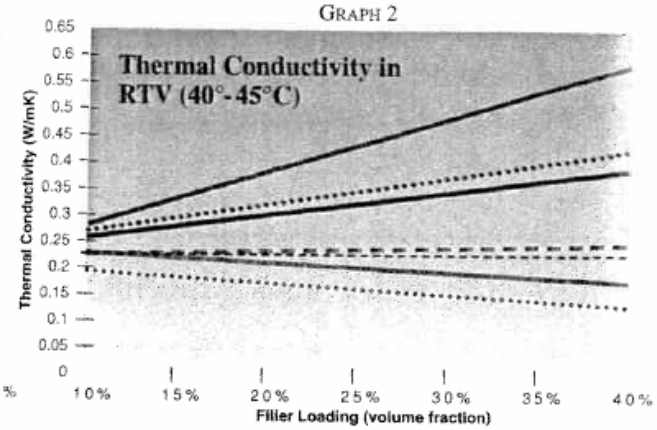
Legend

- K1
- K46
- W1300
- G400
- W410
- $CaCO_3$
- Control (unfilled resin)

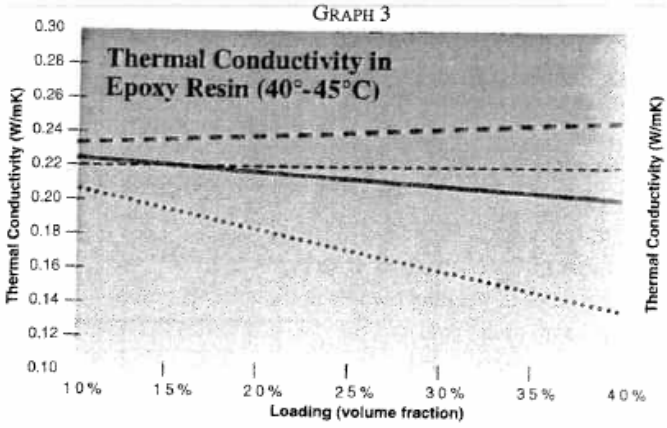
GRAPH 1



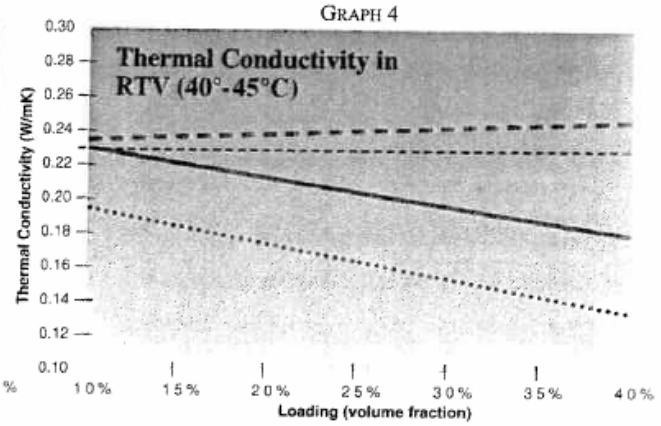
GRAPH 2



GRAPH 3



GRAPH 4



For further information or sales assistance, contact 3M Specialty Additives

1-800-367-8905 • Fax 651-736-4133
In Canada, 1-800-410-6880, ext. 6019.
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Materials Health, Safety And Environmental Data Sheet

MSDS #14090

Product Identification	Product Name: **Adhesive Primer Sealer** #14090 General Usage: Exterior Latex Wall Primer General Description: Non-Pigmented Latex Wall Primer C.A.S. Number: None Established; Mixture
Distributor Information	Distributors Name: Rhino Shield Coatings Address: 111 Bailey Drive; Suite 1; Niceville, FL 32578 Emergency Telephone: 800-729-8933 Information: 850-729-8031 Date Effective: January 1st, 2003
Chemical And Physical Properties	Color: Clear Physical State: Liquid Boiling Point: 212 Fahrenheit Specific Gravity: (H_2O=1): >1 Vapor Presence: about same as H_2O Percent Volatile: 55-60% Evaporation Rate: (Butyl Acetate=1): <1 Odor: Pungent Odor Odor Threshold: Unknown Melting Point: N/A Freezing Point: 32 Fahrenheit Solubility in H_2O: Soluble pH (undiluted): 8 to 8.5 Vapor Density (Air=1) <1
Fire Protection Information	Decomposition/Combustion: N/A Flash Point: N/A Does Not Burn Recommended Extinguishing Media: N/A Flammable Limits: N/A
Storage And Reactivity	Hazardous Polymerization: Will Not Occur Storage Conditions: Keep from Freezing Toxic Products Which May Form: None
Transportation	Hazard Classes: None, Not Hazardous Hazard Labels: Not Required Hazard Determination: MSD Sheet Shipping Containers: Varies
Container Labeling	Explanation of Unique Labeling System: None Used

Health Hazard Data	Short Term Exposure	
	Route of Entry:	Precautionary Treatment
	Inhalation:	None Expected
	Skin:	None Expected
	Eyes:	Flush Immediately with large amounts of water for at least 15 minutes, holding eyelids open. Call a physician of irritation persists
	Ingestion:	Call a physician if significant amounts have been swallowed. Give patient large amounts of water or milk for dilution.
	Long Term Exposure	
	Carcinogen:	None
	Target Organ Effects:	None
	Other Health Hazards:	None Known
Personal Protection	Respiratory Protection: No inhalation hazard expected Protective Clothing: None Required Ventilation: Local Other Protective Measures: None Eye Protection: Safety Glasses	
Spill or Leak Protection	Accidental Release or Spill: Collect liquid or solidify with absorbent package for disposal Neutralizing Chemical/Media: N/A	
Treatability	Biodegradability: With water prior to cure. Influence on Biological Wastewater Treatment: None Other Impacts on Wastewater Treatment: None Recommended Wastewater Treatment: Dilutable Constituents Interfering With or Not Amenable to Biological or Wastewater Treatment: None	
Recommended Waste Disposal	Unused Material: Solid Waste Landfill Container Disposal: Landfill Spent Material: Solid Waste Landfill Hazardous Disposal: N/A	

Form based on O.S.H.A. Form 20. Information presented herein has been compiled from sources to be reliable and is accurate and reliable to be the best of our knowledge and belief but is not guaranteed to be so.

Rhino Shield — Materials Health, Safety And Environmental Data Sheet

MSDS #14025, 14026 & 14027

Product Identification	Product Name: **Durable Finish Coat** #14025, #14026 & #14027 General Usage: Exterior Latex Coating General Description: Pigmented Latex Wall Coating C.A.S. Number: None Established; Mixture
Distributor Information	Distributors Name: Rhino Shield Coatings Address: 111 Bailey Drive; Suite 1; Niceville, FL 32578 Emergency Telephone: 800-729-8933 Information: 850-729-8031 Date Effective: January 1st, 2003
Chemical And Physical Properties	Color: White Physical State: Liquid Boiling Point: 212 Fahrenheit Specific Gravity: (H_2O=1): >1 Vapor Presence: about same as H_2O Percent Volatile: 30-35% Evaporation Rate: (Butyl Acetate=1): <1 Odor: Pungent Odor Odor Threshold: Unknown Melting Point: N/A Freezing Point: 32 Fahrenheit Solubility in H_2O: Soluble pH (undiluted): 8 to 8.5 Vapor Density (Air=1) <1
Fire Protection Information	Decomposition/Combustion: N/A Flash Point: N/A Does Not Burn Recommended Extinguishing Media: N/A Flammable Limits: N/A
Storage And Reactivity	Hazardous Polymerization: Will Not Occur Storage Conditions: Keep from Freezing Toxic Products Which May Form: None
Transportation	Hazard Classes: None, Not Hazardous Hazard Labels: Not Required Hazard Determination: MSD Sheet Shipping Containers: Varies
Container Labeling	Explanation of Unique Labeling System: None Used

Health Hazard Data	Short Term Exposure	
	Route of Entry:	Precautionary Treatment
	Inhalation:	None Expected
	Skin:	None Expected
	Eyes:	Flush Immediately with large amounts of water for at least 15 minutes, holding eyelids open. Call a physician of irritation persists
	Ingestion:	Call a physician if significant amounts have been swallowed. Give patient large amounts of water or milk for dilution.
	Long Term Exposure	
	Carcinogen:	None
	Target Organ Effects:	None
	Other Health Hazards:	None Known
Personal Protection	Respiratory Protection: No inhalation hazard expected Protective Clothing: None Required Ventilation: Local Other Protective Measures: None Eye Protection: Safety Glasses	
Spill or Leak Protection	Accidental Release or Spill: Collect liquid or solidify with absorbent package for disposal Neutralizing Chemical/Media: N/A	
Treatability	Biodegradability: With water prior to cure. Influence on Biological Wastewater Treatment: None Other Impacts on Wastewater Treatment: None Recommended Wastewater Treatment: Dilutable Constituents Interfering With or Not Amenable to Biological or Wastewater Treatment: None	
Recommended Waste Disposal	Unused Material: Solid Waste Landfill Container Disposal: Landfill Spent Material: Solid Waste Landfill Hazardous Disposal: N/A	

Form based on O.S.H.A. Form 20. Information presented herein has been compiled from sources to be reliable and is accurate and reliable to be the best of our knowledge and belief but is not guaranteed to be so.

Laboratory Report

AmCoat Industries, Inc.
Rhino Shield Coatings

11/11/04

CON 04-173 Project

ASTM D 6083-97a

Physical Property	ASTM Test	Requirement	Rhino Shield DFC-W	Rhino Shield APS
I Colloidal properties				
Viscosity (KU)	D 562	85-141	105.3	99.9
Viscosity (Brookfield LVT #4 @ 6 rpm)	D 2196	12-85 poise		
Volume solids (% calculated)	D 2697	>50		
Weight solids (%)	D 1644	>60	57.1	35.7
II Mechanical properties of the film Tensile-elongation testing conditions: (1/2" sample width, 1" jaw separation, 1"/minute speed of pull)				
A. After 14 days drying in standard lab conditions				
Tensile strength[1] @ 73°F	D 2370	>=200 lb/in^2	377	65
Elongation[1] at break @ 73°F	D 2370	>=100 %	398	2642
B. After 1000 hours aging in a Xenon Arc Weatherometer				
Elongation[1] at break @ 73°F	D 2370	>=100 %	139	2279
Accelerated weathering (cracking & Checking)	D 4798	Nil	Nil	Nil
III Other properties of the film				
Wet Adhesion[2] -Polyurethane foam	C 794/ D 903	>2 lb/in	0.11	0.89
Wet Adhesion[2] -Galvanized	C 794/ D 903	>2 lb/in	3.40	3.92
Tear Resistance[1] (Die C)	D 624	>60 lbf/in	133.0	29.1
Permeance[2]- Inverted	D 1653A	<50 perms	32.7	3.2
Permeance- Upright	D 1653A	NR	24.3	3.9
Water swelling[1]	D 471	<20 weight %	11.9	37.6
Fungi resistance	G 21	Zero	ND	ND
IV Other non-required test results				
Dry Adhesion[2] -Polyurethane foam	*C 794/ D 903*	*NR*	1.40	3.20
Dry Adhesion[2] -Galvanized	*C 794/ D 903*	*NR*	10.42	4.40

NT = Not tested *NR = Not required* [1] Only three specimens tested [2] Only two specimens tested.

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BASF

3M Worldwide

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The Chemical Company

Federation of Societies for Coatings Technology
YE OLDE PAINT STONE
1737

COMMERCIAL TESTING COMPANY

Historic Columbus
FOUNDATION

April 29, 2010

Mr. and Mrs. Jeff Ecklund
Georgia Coatings
1635 Lakes Parkway, Suite C
Lawrenceville, Georgia 30043

Dear Roxanne and Jeff:

On behalf of Historic Columbus, please accept this letter of support for the product Rhino Shield. Your team recently applied the ceramic coating to the Rankin House, a National Register property and Historic Columbus' headquarters.

In researching this product in relation to historic properties, the only concerned addressed was the amount of pressure applied during the initial cleaning process. High pressure cleaning on historic properties has proven to be destructive to the older materials. Once the requirement to have only the lowest amount of pressure for cleaning was established, the remainder of the application was appropriate for the structure.

We were very pleased with the product and with the team you provided to do the work. We are also excited to know that the Rankin House, which is an architecturally significant property in our community, will have long lasting beauty thanks to Rhino Shield.

Sincerely,

Elizabeth K. Barker
Executive Director
Historic Columbus Foundation, Inc.

2930 N. College with RS primer

2930 N College with RS primer and finish coat

House in Crawfordsville, IN – with RS primer

House in Crawfordsville – with RS primer and finish coat

Detail photo of house in Crawfordsville

House in Broad Ripple (6042 Kingsley) – with RS primer – applied 2003

House in Broad Ripple (6042 Kingsley) – with RS primer and finish coat – finished 2003

Unidentified location – with RS primer – applied 2008

Unidentified location with RS primer and finish coat – finished 2008

House in Clermont – with RS primer – applied 2003

House in Clermont – with RS primer and finish coat – finished 2003