Lifetime™ Waterproofing Sealant System

1. PRODUCT USE: Lifetime™ Waterproofing Sealant has been developed to be used on concrete, masonry, wood, stucco, canvas and other porous substrates to prevent water penetration and the damage it can cause. Lifetime™ Waterproofing Sealant can be used on horizontal, vertical and wear surfaces.

2. COMPOSITION AND MATERIALS: Lifetime™ Waterproofing Sealant is a penetrating, permanent waterproofing treatment prepared by using specified silicone rubber. This type of silicone has been tested in actual use in all climates for over 45 years, showing no deterioration from ultraviolet rays, acid rain, salt and salt spray. In cured form this product has been subjected to accelerated weathering and has shown no breakdown at periods exceeding 100 years. In addition, the product contains solvents and other chemicals of a proprietary nature. The product also has penetrating and bonding characteristics that allow an effective one coat application.

3. MAINTENANCE: Lifetime™ Waterproofing Sealant requires no maintenance. It does not yellow or harden with age.

4. TECHNICAL DATA:
Specification Writers: The following values are not intended for use in preparing specifications. Complete technical services are available for the manufacturer, including assistance during design and specifications stage. Additional product and testing information is also available.

Lifetime™ Sealant is a penetrating silicone rubber material, designed to give a permanent treatment to wood, concrete, masonry and other porous substrates. Lifetime™ is not a water repellent. Lifetime's™ unique feature is that it actually prevents water from penetrating the surface to which it is applied.

TECHNICAL TESTS:
A. Exterior Exposure: Samples of the base material have been exposed for 45 years without deterioration from ultraviolet rays, acid rain, salt spray and other climatic conditions. Samples have been exposed to weatherometer testing equal of 100 years without breakdown.

NOTE: These tests show that Lifetime™ Waterproofing Sealant will not deteriorate. Certain factors may influence the deterioration of the substrate, beyond the penetration of water.

B. Concrete Exposure: An independent state laboratory* tested the performance of Lifetime™ Waterproofing Sealant against other sealers and bare concrete. The samples were exposed to 378 freeze / thaw cycles and the weight loss determined. Untreated concrete lost 33.7% to 68.1% and Lifetime™ treated concrete lost only 1.2%. The same laboratory conducted skid readings, which stated that "sealed surfaces show and indicate little or no effect on the skid resistance." The product should not make concrete more slippery

*A copy of the "Utah Department of Transportation Research and Development Unit, Laboratory Study to Aid in the Selection Procedures for Concrete Sealers" is available upon request from the manufacturer.

C. Penetration and Water Transmission:
Laboratory tests show that the absorption of water on cedar treated with Lifetime™ versus untreated cedar is at the ratio of 24 to 1, or that untreated cedar absorbs 96% more water than cedar treated with Lifetime™. Tests on pine show a similar improvement. Tests show that the cured material makes a perfect barrier for liquid water, yet allows water vapor to freely move in and out, to maintain a moisture equilibrium with the atmosphere.

D. Improves Life Cycle: All tests show that this material greatly improves the life cycle of wood, concrete and masonry. The State of Utah Department of Transportation concluded that "using concrete sealer on old or new concrete would be economically beneficial by extending the concrete's life by several years." The same applies to wood or masonry.

Lifetime™ Waterproofing Sealant System

TECHNICAL DATA

E. Cured Properties: (Solid State)

Perm Rate ASTM E96-66	7.26
Permanence in contact with liquid water	
U.S. Perms	4.5
Grains/hr. ft² in Hg	1.9
ASTM 412:	
Elongation (Std. Dev. = 64)	435%
Tensile strength (Std. Dev.=76)	342 psi
ASTM 412:	
Brittle Point	less than –73°C less than -100°F
Linear Coefficient of Thermal Expansion (inch/inch/°F)	0.0007*
Durometer hardness, Shore A	20-30
Thermal Conductivity (BTU in/hr.ft²)	2.3
Maximum Service Temperature	450°F/232°C

*The coefficient of thermal expansion was not determined, this value is typical value for this type of silicone rubber.

F. Uncured Properties: (Liquid State)

Color	Translucent
Consistency	Pourable
Weight per Gallon	9.0 pounds
Flash Point (ASTM D-93)	106°F/41°C
Boiling Point	320-380°F/160-193°C
Vapor Pressure (mm Hg.)	2.6
Vapor Density (Air = 1)	4.78
Viscosity	25,000-35,000
Application Temp.	Above dew point from -20°F to +100°F/-29°C to 38°C
Packaging:	U.S. quarts, one & five gallon containers & 55 U.S. gallon barrels.
Shelf Life:	12 months unopened

G. Anti-Graffiti:
Because Lifetime™ Waterproofing Sealant forms a membrane to which paint does not readily adhere, graffiti can easily be removed by pressure washing.

5. LIMITATIONS:
- Application should not be on a wet or dirty surface.
- Application should not be undertaken over refrigerated tanks or areas where a thermal barrier is required.
- Application must not occur in an interior space where a thermal barrier is required.
- Application must be in accordance with manufacturer's Application and Use Guidelines.

6. INSTALLATION: The manufacturer furnishes, at no charge, a page entitled "Questions and Answers" which answers frequently asked questions about installation. See section 4 of the Lifetime™ catalog for complete instructions.

Preparation: The surface must be clean and dry. All materials including any prior treatment, which would interfere with the penetration of Lifetime™ Waterproofing Sealant MUST be removed.

Use as supplied: Lifetime™ Waterproofing Sealant must be used as it is supplied, with no additives or dilutions. The product container should be shaken modestly prior to application.

Applications: Applications must not take place in inclement weather. Apply product by airless spray, brush, broom or by immersion. On vertical surfaces apply product from top to bottom.

Drying time: will vary according to temperature and humidity. The drying time can vary significantly from one hour upwards.

Clean up: Clean application equipment immediately after use with mineral spirits or paint thinner. Re-seal a partially used container immediately.

7. AVAILABILITY AND COST:
Availability: Lifetime™ Waterproofing Sealant is available throughout North America and is VOC compliant. Contact Coatings International, Inc. for availability elsewhere.

Cost: Contact Coatings International, Inc. for current pricing. Prices may depend upon quantity, container size and applicable freight.

8. COVERAGE PER GALLON: These are estimates and may vary considerably due to the porosity of the recipient material.

Surface Type	Sq. Ft.	Sq. M.
Stucco	170	15.8
Wood Shingles	110	10.2
Fencing	125	11.6
Decking	140	13
Driveways/Concrete	150	13.9
Stone – smooth	170	15.8
Stone – rough	130	12
Exterior Brick	120	11.2

9. WARRANTY:

Limited Warranty: Lifetime™ Sealant Products, Inc. warrants Lifetime™ Waterproofing Sealant to be free from defects in materials and workmanship. In the event of a defect Lifetime™ Sealant Products, Inc. will replace the product necessary to reapply the affected area free of charge or at its option, refund to the purchaser and amount equal to the amount paid for Lifetime™ product in the affected area. This warranty is extended only to the original purchaser. Purchase receipt or other proof of original purchase will be required before warranty performance is rendered. This warranty only covers failures in materials or workmanship which occur during normal use and in accordance with application guidelines.

Limited Warranty & Exclusions:

There are no express warranties except as stated. Lifetime™ shall not be held liable for the cost of labor, incidental or consequential damages resulting from the use of this product or arising out of any breach of this warranty. Lifetime™ Waterproofing Sealant is a penetrating sealer and we specifically exclude any liability for normal surface wear and composition or state of material on which Lifetime™ Waterproofing Sealant is applied.

Published technical data and instructions are subject to change without notice. Please contact your Coatings International representative for the most current information.

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The Houston Chapter of the Construction Specifications Institute

TECHNICAL INSERT

Larry D. Jones, Editor

Silicone Rubber Penetrating Water Repellents

By: Desmond A. Fatter, Jr.; E. A. Fatter & Associates, Inc.

A new adoption of an old technology has appeared on the market offering unique physical characteristics in the field of water repellents – RTV silicone rubber dissolved in a solvent carrier. "RTV" stands for Room Temperature Vulcanizing. These penetrating sealers can be applied to any vertical, porous substrate such as concrete, masonry, brick, or wood.

All surfaces to be treated should be thoroughly cleaned of all dirt, dust, debris, mildew, staining, discoloration, and oil, etc., prior to sealing. Cleaning may be accomplished by high pressure washing, sandblasting, or chemical cleaning. When chemicals are used they must be removed by high pressure water before application of the sealer. Refer to manufacturers literature for specific product and installation recommendations.

When applied to cleaned, dry surfaces with either an airless sprayer, roller or brush (depending on the nature and porosity of the substrate), the solvent carrier transports the silicone solids into the substrates capillary system. A 5 - 9 inch (12.7 - 22.86 cm.) rundown is desirable for most vertical surfaces. Application rate may vary depending upon the porosity and texture of the surface but average coverage on concrete surfaces is approximately 150 square feet (13.9 square meters) per US gallon. During evaporation of the solvent, the silicone solids absorb relative humidity which acts as a catalyst to the cure mechanism. Atmospheric moisture is absorbed, a chemical reaction occurs, and the solids vulcanize to a synthetic silicone rubber in the capillary system of the substrate. Product cure time varies, but is surprisingly fast – anywhere from one to four hours depending on temperature and humidity. The higher the temperature and relative humidity, the faster the cure time. Water repellency occurs within that period.

Containers of material left open, or not tightly sealed, will absorb moisture and cause the product to cure in the container. Product in partially used 5 gallon containers can be saved by transferring material into one gallon cans. Filling cans completely to the top and sealing tightly minimizes the amount of air (thus moisture) in the can.

Little, if any, discoloration appears to occur in the substrate after cure and no alteration of surface texture is seen. However, test applications should always be made to determine any unforeseen problems. Treated surfaces do not appear to attract dirt as do in-place silicone elastomeric joint sealants.

Such materials offer a high perm rate allowing moisture vapor to escape building substrates while not allowing liquids to enter the surface. Therefore, this type material should not be applied to substrates where vapor barrier is required. This class of repellents provide elastomeric properties offering as much as 400% elongation. They respond favorably to thermal expansion/compression of porous substrates as well as bridge hairline cracks accommodating movement from seismic activity and atmospheric turbulence up to their elastomeric capability.

Certain of these products also qualify for horizontal wear surface applications where little, if any, change in frictional characteristics can be determined between treated and untreated concrete. Puddling on these horizontal surfaces must be avoided as silicone rubber would then be left to cure on the surface creating a slippery condition. Immediate wipe up with solvent or spreading with a push broom will insure proper penetration.

At least one of these products meet with USDA/FDA approvals for use in meat and poultry plants, food storage areas, and zoological applications.

After application, paint adhesion may be difficult depending upon the substrate and type of paint to be applied. A test area is recommended by the manufacturers. Demarcation lines in parking areas on treated decks may be effected with oil based paints, but will require periodic replacement.

As an anti-graffiti, protectorate however, at least one silicone rubber repellent has been demonstrated to allow environmentally safe clean-up of defiled surfaces. Paints, such as Krylon Enamels, applied from spray containers, can be removed from treated concrete surfaces with nothing more than a 3000 PSI blast 210°F hot water. Some products of this class are formulated to comply with VOC requirements and the states of California and New York utilizing accepted aromatic solvent carriers in place of petroleum-based solvents.

Regardless of the carrier used, this class of repellents generally offers excellent resistance to chemicals, thus allowing certain formulations to be used in industrial applications such as sealing concrete drip-pads and/or retaining walls. Consult with the manufacturer listed below regarding specific chemicals and concentrations against which you wish to seal. At least one product of this type publishes resistance to a hydrostatic pressure of over two atmospheres.

Silicone rubber demonstrates excellent adhesion to glass and most aluminum extrusions. Such areas adjacent to the substrate to be treated should be protected from overspray. Cured silicone rubber is difficult to remove from glass and trim. Mask these areas and protect shrubs.

Because of silicone rubber's elongation and flexibility in its cured state, this class of repellents have been successfully used to seal canvas awnings, tarps, tents, and boat covers without hindering the fabric's ability to "breathe".

The property most appealing in this class of repellents is longevity. Cured silicone rubber is inorganic and while it cannot be said that this material will last forever, of the major manufacturers of silicone polymer with whom I have conversed none are willing to hazard a guess as to how long silicone rubber can be expected to last. Thixotropic (gun grade) silicone rubber sealants have been in existence since the early 1960s. They have been in place on projects for over 30 years. These same sealants are used in the manufacture of this class of repellents.

They demonstrate excellent resistance to extremes of high and low temperature and show no deterioration from ultraviolet radiation, ozone, salt spray, acid rain, etc. One such manufacturer claims their products to be tested in accelerated weathering machines showing "no breakdown at over 100 years". Their product sustained accelerated weathering per Atlas Twin arc. Weatherometer utilizing the ASTM G-23 test method enduring 10,000 hours while exhibiting no change in its curd silicone properties.

Longevity is, of course, a positive aspect of this type product. For every positive, however, there is a corresponding negative. Visualize 5-10 years down the road when someone decides to paint the building and no records have been kept. The resultant paint job might prove disappointing. Keep good records!

According to one manufacturer, the only way found to disrupt the silicone rubber matrix and remove it from a cement substrate is with a potassium hydroxide solution of a pH value of 13-14. This is a very caustic solution. Investigate manufacturer's recommendations on this issue. Due to the difficulty in removing cured silicone rubber once deposited in the capillary system of a substrate, silicone rubber repellents should be viewed as permanent.

Clean up of spray equipment, brushes, rollers, tools, and spillage, etc. should be accomplished with the solvent carrier alone. Solvents employed are usually mineral spirits or Naphtha, but the silicone rubber cure system may dictate the use of other types. Certain cure systems allow the use of high flash point (100°F +) mineral spirits which yields a product classified as "combustible". Other cure systems may contain a low molecular weight alcohol which carrier a "flammable" product rating. Manufacturer's Safety Data Sheets (MSDS) should be reviewed and suitable precautions taken for the corresponding rating.

As always, consult manufacturer's written specifications and recommendations relative to product selection, substrate preparation, and product application. Always make a test patch to determine actual coverage rates and compatibility. Do not dilute or alter these products on any way. They should be applied as they come from the container. Manufacturers should furnish test data to support claims.

The Houston Chapter of the Construction Specifications Institute

TECHNICAL INSERT

Susan Canavespe, CDT - Editor

Sealing Top Level Concrete Decks and Ramps of Parking Garages with Traffic Grade Liquid RTV Silicone Rubber Penetrating Water Repellents.

By: Desmond A. Fatter, Jr.
Contributors – Eric A. Hitchcock and Randy Schleisman

Liquid RTV silicone rubber penetrating water repellents have demonstrated exceptional sealing characteristics on a variety of porous vertical substrates. “RTV” stands for Room Temperature Vulcanizing. Certain of these RTV technologies also lend themselves to sealing horizontal concrete vehicular traffic surfaces in parking garages, particularly to top level decks and ramps. The concrete must possess a broom-finished, skid-resistant surface. Such applications are not designed for high-speed traffic areas such as streets, bridges, freeways, or overpasses.

The cure mechanisms of these products are dependent upon atmospheric moisture. The solvent carriers in these clear sealers transport the dissolved RTV silicone rubber solids down into the capillary system of the concrete surface. The solvent evaporates and the uncured solids absorb relative humidity and cure to a silicone rubber in the capillary system of the substrate. The resulting silicone rubber seal will “breathe”, being permeable to moisture vapor, but not to liquids.

These RTV silicone repellents are capable of bridging hairline cracks up to 1/32”. The treated and cured hairline cracks should then be dressed with a second coat of repellent using a narrow bristle brush. This second treatment, of only the cracks, serves to provide insurance that sufficient cured silicone rubber will be present in the crack to accommodate dynamic movement. These RTV silicone repellents are elastomeric in nature, demonstrating up to 415% elongation. Cured in place, these products will accommodate substrate thermal expansion/contraction. Cracks larger than hairline must be routed and sealed with a low modulus, traffic grade, silicone joint sealant to insure chemical compatibility of the system. The sealant should be installed in the routed crack approximately 1/8” below the traffic surface to minimize stress on the bond line as vehicles roll over the crack. All horizontal expansion joints and intersecting perimeter joints should also be sealed with a low modulus, traffic grade, silicone sealant.

Depth penetrations of RTV silicone repellents average 1/8” to 3/16” depending on concrete porosity. As silicone rubber is inorganic in its cured state, it constitutes a permanent application, unaffected by ultraviolet degradation, heat/cold cycles, salt spray, ozone attack, acid rain, etc. At least one manufacturer publishes cured product temperature physicals from +400°F down to -70°F, and offers test data demonstrating excellent resistance of treated surfaces to chloride ion (salt) penetration. Under Regulation V, published by the Texas Air Control Board, at least one product is in compliance with all current Texas VOC requirements. Material warranties on horizontal vehicular traffic parking decks and ramps are available for up to five years, dependent upon existing conditions at each specific project.

Traffic surfaces must first be thoroughly cleaned prior to application of the RTV silicone repellent. All existing paint stripes, oil spots, rust stains, encrustation, mildew, dirt, etc., must be removed. Oil spots should be pre-treated with chemical solvent degreasers, caustic soaps, or alkali scrubbers, etc., prior to surface blasting operations. To improve overall cleaning

results, it is preferable that several chemical applications be made, with a sufficient period in between each, to allow time for deeply trapped oil to surface and be scrubbed away. Persistent rust stains should be treated with chemical rust removers, in like manner, for best effect.

High pressure surface blasting with automated equipment, utilizing either water or abrasives, has proven most effective in preparing horizontal surfaces to accept RTV silicone repellents. Water blasting with portable rotating multiple nozzled equipment enables the nozzles to be positioned at a uniform distance from the concrete surface during the cleaning process. Such uniformity of surface cleaning is virtually impossible to obtain using hand-held cleaning wands. In using this equipment operating water pressure, water volume, and nozzle tip selection are critical to cleaning results. The concrete surface must be allowed to dry thoroughly prior to application of the RTV silicone repellent.

Abrasive blasting can be accomplished either by open-air sand blasting, or by closed-system metallic blasting. Of the two systems, the closed-system method is the more environmentally safe. Automated steel shot closed-systems impact the work surface with metallic abrasives thrown at high velocity by rapidly rotating blast wheel. As the abrasive scours the work surface, it is rebounded, along with the removed contaminants, into a highly efficient recovery system, thereby eliminating dust and clean-up.

New concrete surfaces require only a high pressure air blow off, or, if necessary, a high pressure water blast, the surface then being allowed to dry thoroughly prior to the RTV silicone repellent. The repellent should be applied to the dry concrete surface prior to painting parking stripes. This will insure that the integrity of the repellent application is not interrupted, and therefore, violated when paint wears away. Though surfaces treated with RTV silicone repellents tend to reject paints (they are excellent anti-graffiti protectorates), one manufacturer suggests that parking strips can be applied to treated surfaces successfully by adding _ pint of RTV silicone repellent per one gallon of oil based paint. This method appears to offer acceptable paint adhesion to treated surfaces for striping purposes only. General painting of vertical or horizontal treated surfaces is not recommended.

The RTV silicone repellent is applied by means of a low pressure sprayer to the cleaned, dry, concrete surface at an average rate of 125 square feet per gallon. Coverage rates will vary depending upon surface porosity. Test patches should always be made on every project to determine percent solids required, and proper coverage rate. Care should be taken that all RTV silicone repellents completely penetrate the horizontal surface to which they are applied. RTV silicone repellents which are allowed to pool, and then cure on a traffic surface, may produce a slippery condition when wet.

Should windows be encountered at a level close to the traffic surface to be treated, all glass and aluminum extrusions should be masked to avoid possible silicone rubber repellent overspray.

As always, consult manufacturer's written specifications and recommendations prior to product specification, and application. Always specify that test patches be made to determine actual coverage rates and compatibility. Do not dilute or alter these products in any way. They should be applied as they come from the container. Manufacturers should be prepared to furnish test data to support all claims.

For additional information on this class of water repellents, refer to the Technical Insert published in the February, 1992 issue of the Heartbeat.

LIFETIME™ WATERPROOFING SEALANT TESTING RESULTS

Independent Test Results* using Lifetime™ Sealant indicate:

- Sharp gains in compression strength of concrete.
- High resistance to Chloride Ion penetration.
- Efficient perm rate; permits concrete to cure slower and harder.
- No significant change in frictional properties.
- Impermeable to liquid water, yet allows trapped moisture to escape by vapor

Lifetime™ Sealant is a penetrating silicone rubber material, designed to give permanent treatment to wood, concrete, masonry and other porous substrates. It prevents water from penetrating the surface, it is not a water repellent.

TECHNICAL TESTS

1) Exterior exposure:

Samples of the base material have been exposed for 45 years without deterioration from ultraviolet rays, salt spray, acid rain, and other climatic conditions.

Samples have been exposed to thermometer testing equal of 100 years without breakdown.

NOTE: These tests show that the Lifetime™ Sealant will not deteriorate. Certain factors may influence the deterioration of the substrate beyond the penetration of water.

2) Concrete exposure:

An independent state laboratory tested the performance of Lifetime™ against other sealers and bare concrete. The samples were exposed to 378 freeze thaw cycles and the weight loss determined. Lifetime™ was one of the best at 1.2%, untreated concrete lost 33.7% to 68.1%.

The same laboratory conducted skid readings and “Sealer products indicate little of no effect on the surface resistance”. The product should not make concrete more slippery.

3) Penetration and Water Transmission:

Laboratory tests show that the absorption of water on treated cedar versus untreated cedar is at the ratio of 24 to 1, or that untreated cedar absorbs 96% more water than treated cedar. Tests on pine show a similar improvement.

Tests show that the cured material makes a nearly perfect barrier for liquid water, yet allows water vapor to freely move in and out, to maintain a moisture equilibrium with the atmosphere.

4) Slip Resistance – Wood

Comparison of Lifetime™ with the leading commercial product show that the two are equal.

Untreated, milled #2 pine showed no change in slip between treated and untreated.

Treated (wolmanized) pine showed a definite change when both were applied. It is believed that this is due to sealing the surface after the effects of water on the wood at the time of treatment.

All tests show that this material greatly improves the life cycle of wood, concrete, and masonry. To quote the State of Utah, "using concrete sealer on old or new concrete would be economically beneficial by extending the concrete's life by several years". The same applied the wood and masonry.

Published technical data and instructions are subject to change without notice. Please contact your Coatings International representative for the most current information.

* Utah Department of Transportation Research and Development Unit test data is available to interested parties.

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HAUSER CHEMICAL RESEARCH, INC.

July 27, 1990
Report #890751-9

MATERIALS: Sealant product formulated for IDC, Inc., identified as "Commercial Grade" product, compared with Petrarch SE and Glassclad FF products.

RESULTS: The three products were tested together for comparison. Cedar coupons 2" square, about 3/8" thick, were soaked for 30 seconds in each product, then wiped off with a soft cloth and allowed to cure for three days. The weight gain due to the cured rubber in the wood was measured. The weight of the original product necessary to provide that much rubber was also calculated, and these weights were related to the original weight of the wood coupons.

The coupons were soaked in water for one minute, then wiped dry of surface moisture with a soft cloth. After one minute conditioning, the weight of water taken up by the coupons was measured. The water was related to the original weight of the coupon, and to the weight of the absorbed rubber. A control coupon (untreated) was included in the tests. The results of the measurements and calculations are given in the Table:

	Petrarch FF	Petrarch SE	Lifetime Commercial	Control
Coupon Weight:	10.155	7.669	8.066	10.778
Weight of cured product:	.3456	.1335	.0369	-
Solids content of product:	49.1	33.0	8.0	-
Weight of raw product:	.704	.405	.527	-
Water absorbed:	.0313	.0213	.0314	1.0054
Water as % of coupon weight:	.31	.28	.39	9.3
Weight of solids per wt. of water:	11.0	6.27	1.18	-

The two Petrarch products are much higher in solids content then the claims made for the Lifetime™ sealants. They are also much higher in viscosity, which retards penetration into porous substrates. During the application of the SE and FF products, it was noted that they tended to remain on the surface. When the surface coating is allowed to dry and then cure, a water resistant coating results. Such a coating is far more susceptible to damage through erosion, abrasion or other light physical damage, as well as by exposure to temperature extremes.

The Lifetime™ product, on the other hand, penetrates instantly into a porous substrate, and following drying provides thorough protection. It cannot be abraded off the substrate, since it is throughout the material, and it is protected from degradation due to UV exposure or other weathering effects by being internal, rather than a surface coating.

Similar protection from water absorption was obtained for the short treatment with all three products. However, the protection obtained per unit weight of cured product is far greater with the penetrating sealant, with approximately ten times as much solids being required for the FF, and six times as much for the SE product, as for the Lifetime™ product. This reflects the fact that the water repellent nature of the material is throughout the body of the test coupon, rather than just on the surface. By repeated applications, the pores can be entirely filled by use of the penetrating sealer, but only the surface can be entirely filled using the coating sealers.

WORK REPORTED BY:

_____
Ronald Turner
Chemical Project Manager

Copy: Ellen Winner

HAUSER CHEMICAL RESEARCH, INC.

January 30, 1990
Test Report No. 89-0751-4

MATERIALS: Sealant product formulated for IDC, Inc., identified as "Industrial Grade" product.

TESTS: Determine performance specifications for materials.

TEST METHODS: Bond paper was impregnated with the product, allowed to cure, and then tested for moisture permeability. A comparison test was performed on a sheet of the same paper without treatment.

A sheet of the material was solution cast on a piece of glass, then cured at 100°C. Pieces of the resulting sheet were tested for tensile strength, elongation, and hardness. The permeance was measured by the method of ASTM E-96.

RESULTS: The results of the tests are given in the Table:

Properties of the Cured Film

Permeance in contact with liquid water:	
(U.S. Perms)	4.5
(Grains/hr. ft.^{2} in Hg)	1.9
Durometer Hardness, Shore A	20 – 30
Tensile Strength, psi (Standard Deviation = 76)	342
Elongation, percent (Standard Deviation = 64)	435
Brittle Point, degrees C	below -73
degrees F	below -100
Thermal Conductivity (BTU in./hr. ft.^{2} °F)	2.3
Maximum service temperature,	450°F / 232°C
Linear Coefficient of Thermal Expansion (inch / inch / °F)	0.0007*

* The coefficient of thermal expansion was not determined; this is a typical value for silicone rubber.

January 30, 1990
Test Report No. 89-0751-4

DISCUSSION:

The permeance is a measure of how rapidly water vapor transfers through the film. A dead air space transfers vapor at a rate of about 120. A nearly perfect vapor barrier, such as aluminum foil backed kraft, will have a value of about .005. A value if 1.9 indicates that 1.9 grains (.123 grams) of water vapor will transfer through one square foot of the barrier each hour, if the difference in vapor pressure of water is one inch of mercury.

The silicone rubber coating is impermeable to liquid water, because the water cannot "wet" the silicone. However, the relatively high perm measurement means that water vapor can freely escape from the substrate. This combination of very low liquid water transmission plus relatively high vapor transmission will be beneficial for materials such as concrete, which inevitably absorb water from inside the building, from footings, and from rainfall. The absorbed water, if trapped by a totally impermeable outer coating, may condense in the concrete near the outer wall. In cold weather this trapped water can freeze and cause spalling of the concrete. A water repellent barrier, such as the silicone rubber sealant, can prevent essentially all the rain water penetration. However, it still allows water which may have been absorbed from underground, or from inside the building, to escape as vapor.

WORK SUPERVISED BY:

_____
Ronald Turner
Chemical Project Manager

WORK PERFORMED BY:

Julie Krause-Singh
Engineer

HAUSER CHEMICAL RESEARCH, INC.

March 12, 1991

To: Lifetime™ Sealant Products, Inc.

In response to your request, here is a discussion of expected compatibility of Lifetime™ Sealant with several materials of construction. As we discussed, these options are based on a study of the product literature and on our knowledge of materials. We have not tested the compatibility of Lifetime™ with the brands of products discussed here, but we are familiar with the chemistry involved in these kinds of products. We are basing our expectations on this understanding of sealant chemistry.

Ashford Formula (Curecrete Chemical Company, Inc.)
A study of the product literature and Material Safety Data Sheet (MSDS) shows that this product is probably a water solution of Sodium Silicate of (perhaps) a mixture of fluosilicate and silicate. Ideally, these materials react with some of the soluble calcium, magnesium, and aluminum compounds in partially cured concrete, forming insoluble silicates such as calcium silicate. To the extent this is successful, some of the possible efflorescence (caused by movement of soluble salts to the surface of the concrete followed by evaporation to form white crusts) is suppressed because soluble calcium is tied up as calcium silicate. Of course, there is still the soluble sodium or other alkali metal which was used as a carrier for the applied silicate.

Once the Ashford Formula is in place and cured, there should be no chemical interaction with Lifetime™ sealant. Also, we would not expect any reduction in effectiveness in applying Lifetime™ product after a silicate type sealant, if the silicate has not fully sealed and filled the concrete.

On the one hand, if the Ashford Formula has successfully sealed the concrete so that no porosity remains, then not so much Lifetime™ will penetrate. Of course, very little would be needed in such regions.

On the other hand, if the concrete is not well-filled by the Ashford Formula, the Lifetime™ product should penetrate well and function as intended. Any sealing effect of the Ashford product would probably add to the overall sealing effect. We would agree with your assessment, that if water penetrates, the Lifetime™ product will also. It will, of course, penetrate better (faster and deeper) than water.

Sikaflex-2c Joint Sealant (Sika Corporation)
Based on the product literature, this is a two-part Polyurethane sealant. Before cure, it is not compatible with solvents, but after curing, it will be insoluble in all but the most aggressive solvents. As you know, the Lifetime™ material releases a low level of acetic acid (vinegar) during cure. This will not harm cured polyurethane, but could affect the cure if the joint compound has not yet cured. If the Sikaflex-2c sealant is in place and cured, one would expect no particular chemical interaction between the sealant and the Lifetime product.

According to the Sikaflex literature, the cured product is Jet fuel resistant, and is paintable with water-, oil-, and rubber-base paints. These listed properties imply that the cured material will be compatible with hydrocarbons as well as with other solvents used in paint. In the instructions for use of the Sikaflex compound, advice is given to avoid contact with alcohol and other solvent cleaners during cure. Also, “Do not cure in the presence of curing silicones”.

Both products cure by chemical reactions. After cure, they are not soluble in most solvents, nor will they react with ordinary reactive chemicals or other curing systems. We would expect no chemical interaction of Lifetime™ with the Sikaflex-2c product, when the Lifetime™ is applied after the polyurethane has cured. One possible exception that might occur would be some pigment bleed from the polyurethane sealer on contact with the solvent in the Lifetime™. Although we would not expect this to occur, this condition can easily be tested in a small area by wiping some of the Lifetime™ over the Sikaflex sealant with a white rag, to observe whether there is any bleed of pigments.

Mortar Grout
No chemical interaction would be expected between Lifetime™ and Mortar Grout. Grout will have a varying consistency and porosity, depending on the exact mix used. Cured Grout is very similar to concrete; applied Lifetime™ would be expected to seal it as it does concrete.

I hope the above is helpful to you; if you have any questions, please call.

Sincerely

HAUSER
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Senior Chemist

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