

FACE VALUE

magazine



BEAUTY 'RESTORED'
at Hilton Pearl River

- EIFS Features:**
- ❖ Repair, Restore or Overclad
 - ❖ Cleaning and Maintenance
 - ❖ Sealant Technology
 - ❖ The Sustainability Advantage



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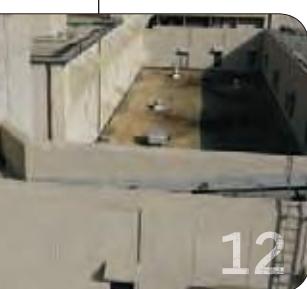
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For information on this publication, please contact: Barbara Catlow (800-556-7752) at Dryvit Systems, Inc., One Energy Way, PO Box 1014, West Warwick, RI 02893.

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A EIFS Restoration: Restoring the EIFS Cladding on Your Building is a Viable Option

By Eric Hoff and Nick Dente

What are the typical questions an owner would ask a forensic engineer (as well as the questions a forensic engineer might be able to answer that an owner would not think of) about the viability of an EIFS repair, recoat or reclad?

What is the condition of the building under the EIFS skin?

Through an analysis of the EIFS cladding, a determination can be made about the condition of the underlying building structure, as well as which method or extent of repairs will be required. In instances when limited water intrusion is discovered (or no water intrusion at all), the goal becomes to work with the building owner to restore the EIFS cladding while creating a maintainable and aesthetically appealing building. Can the EIFS be repaired? If so, what can be achieved through repair as opposed to replacement?

In most cases, the EIFS cladding can be repaired without a complete reclad. If a completed inspection determines that the existing EIFS can be repaired, a repair specification (complete with details) should be prepared – one that will allow the owner to put the project to bid. If a building owner decides to repair the EIFS, will the cladding provide long-term weather protection and performance? In our experience, we have found that EIFS claddings will outperform many other types of siding/cladding or veneer. Of course, it is important to inspect and maintain all building exteriors.

What motivates an owner firm to renovate an EIFS exterior?

And, most importantly for many building owners, it is aesthetically pleasing. Putting the func-

tions of weatherproofing and energy efficiency aside (which, for forensic engineering/architectural firms, are the most important aspects of any cladding system), there's more to discuss about the aesthetic value of EIFS. The ability to give a building an exterior "face lift" while completing the necessary repairs is a very strong motivator for many building owners in making the decision to repair or replace the existing cladding.

For example, building owners can add architectural detailing through the use of Expanded Polystyrene (EPS) or "plantons." Once the repairs have been completed and new details have been added, the entire wall surface receives a new coating, which can allow a building owner to celebrate particular areas of the buildings (such as sign arcades) through the use of color and EPS planton details.

During an inspection of a façade, what are the signals that help determine repair vs. renovation?

After completing inspections on an EIFS façade, the determination to repair or reclad ultimately comes down to how much EIFS will require removal during the repair process in order to create a functioning, maintainable and aesthetically acceptable façade. During the inspection process, forensic engineers/architects look for signals of cladding distress. The





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walls are scanned, probed and assessed through thermal imaging. Although many building owners focus only on the EIFS – thanks to media coverage, incorrect contractor installation and the explosion in construction defect cases – it is important for a forensic building engineer/architect to explain

to the building owner that much of the EIFS failure is not a result of the EIFS itself; rather, it can be attributed to incorrect installation of the product, along with other building components (e.g. other types of siding/cladding/veneer, windows, fencestrations and the roof systems) that interface with the EIFS cladding and allow moisture to get behind the EIFS cladding system.

It is the forensic engineering firm's responsibility to identify potentially problematic conditions, review transitions between the EIFS cladding and dissimilar building materials and provide the building owner with the necessary information to make an educated decision on the future of a building's EIFS façade.

What are the cost considerations?

The most obvious cost consideration is the expense incurred in replacing the EIFS façade vs. repairing the existing façade. Total removal and replacement costs easily exceed repair.

What are the value-adds?

Primarily, the value-adds are about monetary savings through energy efficiency. In addition, aesthetic value can be added to the building through the use of EPS accents and new color schemes. Most importantly, when an EIFS system is restored to meet the manufacturer's specifications, the cladding will provide excellent weather protection for the underlying building structure. ☀

Eric Hoff is president and Nick Dente is principal building science consultant at Portland, OR-based Western Architectural (www.westernarchitectural.com), a national company that is involved in water intrusion preventative analysis and investigations of virtually every type of building.

EIFS and the Buildings Market

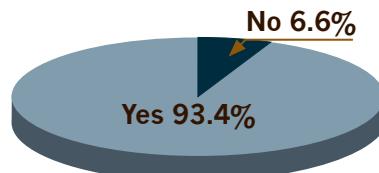
EIFS (pronounced "EEFS") is an acronym for "exterior insulation and finish system(s)." An EIFS is an insulated, multi-layered wall cladding system used in all types of building construction and consists of Expanded Polystyrene (EPS) insulation adhered or attached to an approved substrate, base coat reinforced with a fiber glass mesh and an architectural finish.

EIFS is an energy-efficient cladding that is lightweight and flexible. It can easily be formed to execute dramatic architectural details like reveals, corbels, quoins, etc. A wide range of finishes allows a designer to emulate brick, stone, precast, concrete and plaster details.

Although its initial applications date back to the late 1940s in Germany, EIFS has been a recognized cladding material in the United States since the 1960s. The actual longevity of any specific building depends mainly on the building's actual maintenance program; however, renewing the appearance of EIFS and extending its useful life is now available through DryvitCARE, a strategic plan for such EIFS renewal that includes protocols and products for the inspection, cleaning, replacement of sealant and restoration of the finish surface for a commercial building with EIFS on it.

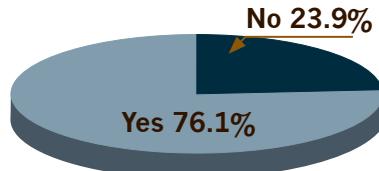
Modernization and New Construction Trends in the Buildings Market is a recently released survey by *Buildings* magazine about its subscribers' purchasing decisions. (The subscriber base is comprised of 72,000-plus senior- and middle-level building ownership and facilities management professionals involved full-time in the design, construction, modernization, management and operation of more than 4.4 million commercial and institutional buildings throughout North America.) Following are statistics based upon a response of "EIFS" when subscribers were asked: "Please check all the products you intend to purchase for your modernization or new construction projects in the next 24 months."

Are you/your firm currently involved in modernization projects?



Based on a response of "EIFS" when asked: "Please check all the products you intend to purchase for your modernization projects in the next 24 months."

Are you/your firm currently involved in new construction projects?



Based on a response of "EIFS" when asked: "Please check all the products you intend to purchase for your new construction projects in the next 24 months."

Beauty ‘Restored’ *at Hilton Pearl River*



Nestled on 17 picturesque acres in a rustic Hudson Valley setting in New York state, the Hilton Pearl River transports its guests back to a more elegant time, whether they are attending one of the many weddings or events on-site, traveling for business or merely seeking a unique destination in which to relax and enjoy its Old World atmosphere.

But there's nothing "old" about the "Chateau in the Country Near the City." Family owned and

managed since its opening in 1988, the European-styled exterior and Country French interiors house modern conveniences delivered by a staff that offers nothing less than the best to its patrons.

According to William V. Maloney, general manager/owner, "When my family built and developed the property in 1988, one of the things that went into the design was the desire to make it unique, and we feel we've certainly done that. The



reaction from guests is unbelievable; some of them say, ‘This has only been here for 19 years? It looks like a 300-year-old building, and I mean that as a compliment.’”

First impressions are everything in the hospitality business, and Maloney admits that the look of the building “is our calling card.” The Hilton Pearl River’s exterior aesthetic and detailing make this facility exceptional and matchless – thanks to the Dryvit Outulation® exterior insulation and finish system (EIFS) selected almost 20 years ago. In 2006, however, the owners noticed

a brownish-greenish tint on the north side of the building and concluded that a thorough cleaning of the façade was in order to restore the facility to its formerly pristine condition. “At first we thought we were involved in a power washing project, where we would wash the entire exterior,” recalls Maloney. “And then, upon further inspection with the help of Nanuet, NY-based restoration contractor Weather-Tite, we realized there were other things that needed to be done as well.”

Dryvit District Sales Manager Mike LeRoy

ALL PHOTOS: COURTESY OF DRYVIT SYSTEMS, INC.



and Gabriel Zitany of Architectural Wall Systems introduced Maloney to the concept of the industry-unique DryvitCARE renewal program, in which an existing Dryvit system can be restored to its original condition or updated using a clearly defined process with 21st-century materials and finishes that may not have been available when the building was first completed. The DryvitCARE concept defines for the building owner the necessary maintenance needed to ensure the long-term performance of an EIFS-clad building. A part of the comprehen-

continued

First impressions are everything in the hospitality business, and William Maloney, general manager/owner, admits that the look of the building “is our calling card.”

About the Hilton Pearl River

- ❖ Located in Pearl River, NY, just 2.5 miles off the Palisades Interstate Parkway at Exit 6W.
- ❖ Five stories in height, with a larger ground-floor footprint than floors two through five.
- ❖ Approximately 150,000 square feet in size.
- ❖ Offers 150 guest rooms and about 25,000 square feet of banquet and meeting space.
- ❖ Recreational amenities include an indoor heated pool, whirlpool and health club offering state-of-the-art fitness equipment.
- ❖ The hotel’s restaurant, La Maisonette, has received a Mobil four-star rating.
- ❖ Original exterior at the building’s 1988 opening: Dryvit Outulation® System.
- ❖ Exterior renovation in 2006: Repair, re-caulk and recoat using the DryvitCARE program with its Platinum Warranty.

“The necessary attention to detail was crucial, but we also needed to ensure that we looked our best throughout the entire process.”

– William V. Maloney, General Manager/Owner, Hilton Pearl River



sive package that intrigued Maloney was the program’s Platinum Warranty (essentially, a new warranty for existing buildings clad with Dryvit Outsulation System), which involves independent, third-party building envelope consultants to prescribe the building’s exterior renewal, and results in a new, transferable system warranty for the Dryvit Outsulation System. Mark Colon of Weather-Tite says, “We met with a certified engineer, walked the building and determined areas

in need of repair. In addition to the necessary cleaning, patching, re-caulking and recoating recommended by the certified engineer, what this program meant to us as a contractor is that everyone was involved in the project’s success. We had support from the engineer, from Dryvit and from the owner to do the best job possible.”

Special situations at the Hilton Pearl River – a larger ground-floor footprint than upper stories (resulting in complicated access issues), the building’s intricate detailing on its exterior, a large number of windows (all of which were re-caulked), a bird roosting concern around dormers and the 24/7 nature of hotel operations – made this project anything but usual. “Thankfully, we worked well with Weather-Tite to avoid any major pitfalls. The necessary attention to detail was crucial, but we also needed to ensure that we looked our best throughout the entire process,”

recalls Maloney. That meant continual co-ordination of schedules throughout the four-month-long process, with multiple crews simultaneously performing cleaning, patching, caulking and coating tasks to ensure the fastest and most effective project delivery.

“While the project did evolve from our original intent of mere cleaning,” says Maloney, “we realized there were things we might have missed if we had not had the help of our contractor and consultant. By its completion, we were confident about our investment. We simply look a lot better than we did and, although our hotel is certainly not for sale, any investor would easily recognize the value added to the property through this exterior restoration.”

Even more importantly, beauty has been restored at Hilton Pearl River – and its clientele will never have to settle for service or a facility that is anything less than impeccable. ☀

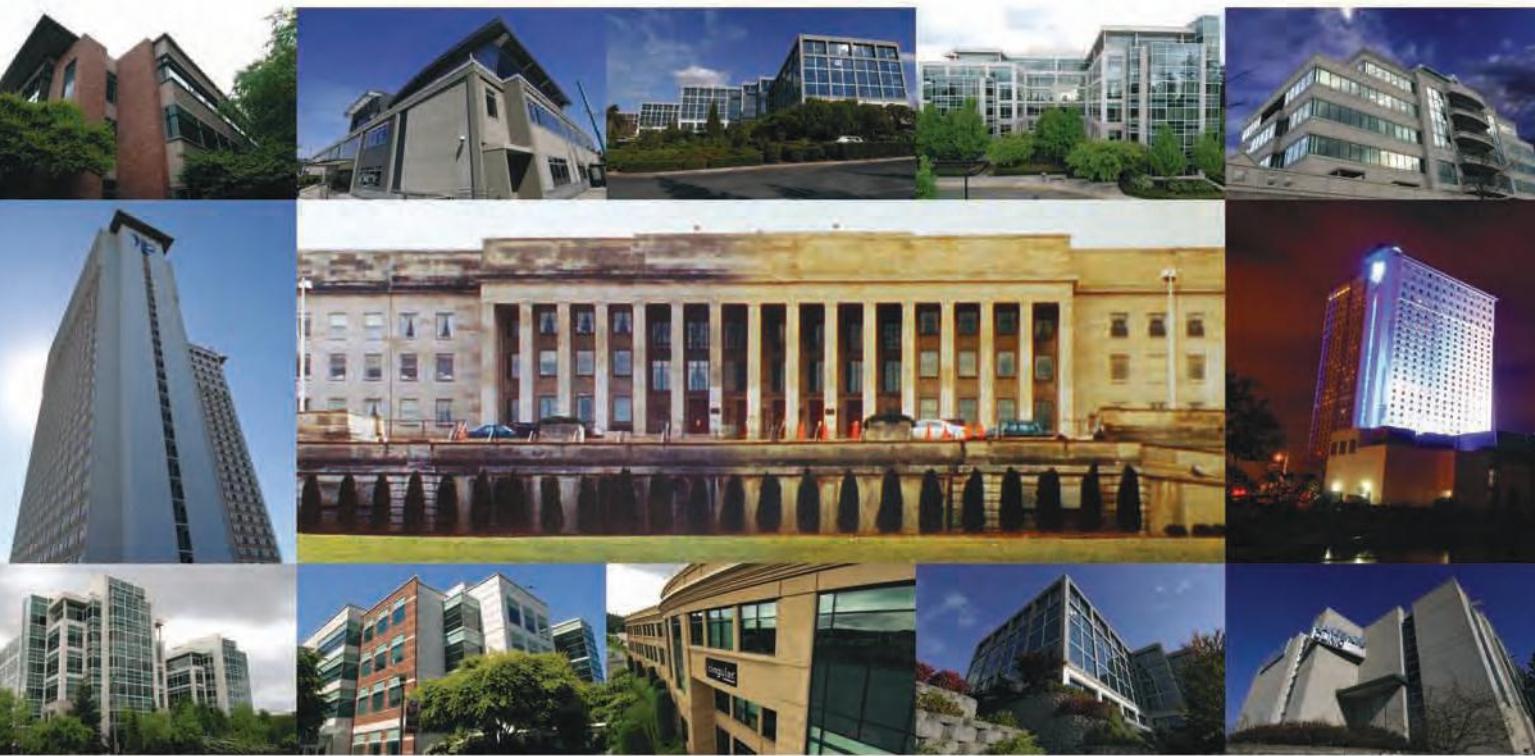
Inspection and Cleaning

According to the DryvitCARE concept, a small investment in routine maintenance can pay long-term dividends in performance. Inspect your building’s exterior annually and clean it thoroughly as needed. This will identify problems when they are small and will keep your building looking its best. This is particularly important if the building is close to a highway or in a damp climate where there are high levels of dirt, mildew, algae or other pollutants. These conditions will affect the frequency of cleaning.

During the visual inspection, look for the following (in addition to the dirt previously mentioned):

- ☒ Worn, damaged or leaking sealant around the openings or expansion joints.
- ☒ Direct damage to the EIFS (e.g. cracks/holes/attachments).
- ☒ Damage or deteriorated flashing.
- ☒ Damage to other exterior components.

If these conditions or any damage to the building envelope are found, contract the services of a trained EIFS professional to immediately repair and minimize potential further damage. Your local Dryvit distributor (a listing is available at www.dryvit.com) can recommend a professional contractor. Be sure that they use only Dryvit-approved components.



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Extending Life: *The Proper Cleaning of EIFS*

By Brent Roberts



Although it is often dismissed by building owners and property/facility managers as simply dirt, there are serious threats to a façade posed by the unsightly grime and organic material that exists on a building. Your building's exterior faces many natural enemies, including air pollution, sun, acid rain, water and ultraviolet radiation (UV).

Simply put, there is money you can save – often, substantial savings – by cleaning your buildings regularly. And, by cleaning your building the proper way, you can more than simply avoid unnecessary maintenance costs; you can actually extend the useful life of your building's exterior. On

the other hand, cleaning it improperly can lead to damage, requiring expensive maintenance.

Cleaning a building's surface does more than remove external contaminants and dirt. While dirt and pollutants pose more of an aesthetic concern than anything else, the threat triggered by water-storing fungi can have serious performance implications for the building.

When mold spores attach to the surface of a building – whether an EIFS surface, masonry, limestone or precast concrete – they start a cycle of life that mars the appearance of the building with water stains. The fungi retain the moisture on the building exterior

and manifest themselves in the form of green, black and gray stains. The destructive properties of water are heightened in that process.

At the same time, the mold that develops on the exterior can lead to deeper problems within the building, contributing to the so-called "sick building syndrome." Not only can this threaten the health of the building envelope, it can also threaten the health of the tenants and employees who work inside.

The extended wet/dry cycle that results may also cause costly structural and surface failure of the exterior material by trapping moisture inside the surface; over time, this can soften the exterior finish coat. During the freezing cycle, it causes expansion, creating cracks and heaves in your walls in the same way that water trapped below a road surface in winter causes breaks and bumps in the surface. In the warmer months, the dark surface created by the fungi can lead to ultraviolet damage to the walls.

Different Reasons for Cleaning

Consider the following reasons for cleaning your building exterior:

Clean to clean. This option positions the building owner/building engineer/property manager in a proactive role of maintaining the integrity of a building's EIF system. Spending a little along the way, as opposed to letting things go until a major restoration is needed, is the better choice. Here, an owner can keep detailed, dated files on the building's exterior maintenance. Staying on top of things and spreading out the financial commitment to the building's



Before and After Cleaning: This building in Athens, AL, is exposed to heat and high humidity, as well as general vehicular traffic.

ALL PHOTOS: COURTESY OF METROCLEANSYSTEMS.COM

exterior really lowers risks, giving owners the added flexibility to sell a property at any time.

Clean to spot repair, reseal, repaint or sealant repair. This type of cleaning is typically done to prepare a substrate for further work, which might include patching repair, sealant repair and a new fresh coating. Sometimes, existing owners are looking for a change in color, or coatings can be applied toward a waterproofing application. In any event, proper adhesion is critical to a successful project. Proper cleaning should not be an oversight.

Clean for overcladding the EIF system. In the event that a complete restoration is called for, a proper preparation of the existing finish coat for adhesion is critical to a long-term successful project. The costs of scaffolding, materials and labor tend to be fairly sizeable in this type of restoration. Not having a sound, clean and sanitized substrate to work with is risking a lot.

Cleaning Recommendations and Cost

Avoid high-pressure-washer applications. Pressure washing removes the color and texture, leaving unsightly wand marks, and can damage caulk and sealants. This type of high-pressure cleaning can end up costing much more in damage than the original cost of the cleaning.

The application of approved cleaning solutions (check manufacturer's recommendations) with a pump/chemical sprayer, followed by a low-pressure garden hose type rinsing process, is ideal for not damaging the substrate. Two applications may be necessary, and gentle agitation with a medium to soft brush can help stubborn stained areas.



The completed cleaning process (in the central part of this side of the building in Athens, AL) shows the dramatic after results.

The bottom line: Separate application of a soap solution, followed by a low-pressure rinse, is the safest and most effective way to clean EIFS and stucco. Realize that it can be harder to remove stains from a building that has not been maintained.

Cost depends on using a separate application of solution or just water-pressure washing. Chemical cleanings involve a two-step process, material cost and more intensive labor cost, resulting in a more expensive price.

Costs can vary for chemical cleaning, from \$0.45 per square foot to over \$1 per square foot, depending on access equipment needed, staging, weekend work, etc. ☺

Brent Roberts, with MetroCleanSystems.com (www.metrocleansystems.com), has cleaned a variety of buildings and substrates throughout the United States. Clients include leading software, hospital/healthcare, major development and casino organizations. His company has experience cleaning buildings of up to 34 stories in height.

Finding the Right Cleaning Contractor

Preparation, experience and a high level of communication are always the precursor to a successful project. Following are general questions to ask a potential cleaning contractor:

- ❖ Do you have experience in cleaning EIFS or stucco? What projects have you completed?
- ❖ What is the process? How will it impact daily business?
- ❖ Does the process involve a pressure washer? What chemicals, if any, will you propose to use? Are the chemi-

cals injected from the washer or a separate application?

- ❖ Will work be done on weekends? If not, how will you protect entrances, exits and pedestrians?
- ❖ What safety precautions do you use to protect the building's tenants and guests as they enter and exit the building?
- ❖ How much noise will be generated by the equipment?
- ❖ Do we need to shut down the HVAC during the cleaning process due to

the smell of cleaning solutions?

- ❖ How will plants and landscaping be protected? What about overspray on cars? What effect might the cleaning solution have on car finishes?
- ❖ If man-lifts or heavy machinery are involved for access, how will you check possible load or weight restrictions on underground parking garages or structures, etc.?
- ❖ How do you propose to handle any possible wastewater issues?
- ❖ Can you perform a demonstration?

Potential for Overcladding



Overcladding is a method by which the existing EIFS wall can be changed aesthetically and renewed. The wall can receive new details (build-outs, plantons or reveals) or an entirely new finish. Overcladding offers an existing building owner the option to use many new textures and specialty finishes that Dryvit did not offer 15 years ago. The overclad application of new finishes can allow for an existing building to be reborn through redesign, reimaging and/or rebranding. This opportunity can be further enhanced through the addition of sculptural, EIFS-based shapes, such as add-on trims, bands, cornice, quoins, etc., and/or the addition of aesthetic grooves being cut into the existing EIFS cladding.

"Overcladding is more than just a recoating," says Barbara Catlow, manager of marketing services at West Warwick, RI-based Dryvit Systems, Inc. "Part of the DryvitCARE program is the cleaning of an EIFS-clad building, repair (if necessary), sealant replacement (if necessary) and then a recoating, which typically means putting an elastomeric coating over the existing finish. In contrast, overcladding is a change in the finish and/or look, whether that is achieved by adding decorative shapes made out of the system, the EPS, reinforced base coat and finish, or just applying a finish to change the original sand texture to a different look, such as granite or brick."

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Overcladding at Dryvit Headquarters

There's no better way to market your product than to use it. That's what has happened at the West Warwick, RI, headquarters of Dryvit Systems, Inc., with respect to a recently completed overclad project. The traditional sand texture on the façade of the company's own building now features one elevation coated with Dryvit's Custom Brick™ finish; the other two are coated with TerraNeo® finish, which looks like granite. See the remarkable progress in the following photos.



Before



After

ALL PHOTOS: COURTESY OF DRYVIT SYSTEMS, INC.

Overcladding at Dryvit Headquarters



FAQs on Overcladding

Does “overcladding” mean I have to tear off the existing EIFS cladding?

Absolutely not. Overcladding can easily be added to/applied over the existing EIFS textured surface. This opportunity would require first cleaning the existing EIFS surface, skim coating it smooth with a non-cementitious base coat and then applying the selected new overclad finish material and/or specialty EIFS shape(s).

Overcladding is also good for the environment, since this process does not require tear-off – and, ultimately, landfill disposal or recycling – of existing materials.

Will the overcladding materials create a “vapor barrier” on the outside of an existing EIFS cladding?

Absolutely not. All Dryvit materials are vapor permeable and will not prevent moisture vapor from moving through the EIFS assembly. A Water Vapor Transmission analysis can be performed if there are any unusual conditions that need consideration.

Why do I need to use a base coat when overcladding?

In a refinish/overclad application, the skim coat over the existing EIFS textured surface provides a smooth base before adding a new textured finish material. Also, the new base coat layer will tie in new architectural features like reveals or shapes to the existing wall.

Chuck Rider, EIFS restoration department manager in the San Leandro, CA, office of St. Louis-based Western Construction Group, concurs with this assessment, noting that the DryvitCARE program was born out of a market need for maintenance and repair help for owners of commercial buildings clad with EIFS. “Western Construction Group has made a very large investment in creating a department dedicated to this market – EIFS repair – by hiring experts from the industry to make sure the knowledge and experience is up to the task.” With respect to overcladding applications, he says, interest is growing, based on both the array of product offerings available as well as the competitive nature of the commercial buildings market.

As in other parts of the economy, branding has become a concept of major importance to the building ownership and facility management segments of the industry. In keeping with this, many of these same professionals have been looking for a “hook” to qualify their buildings as something unique and special. The interest in creating green buildings, a facility that is considered high-tech based upon a significant infrastructure or a complex with a pristine building image and curb appeal that projects “innovation, progress and success” are ways in which to brand a building. Nondescript, ordinary and utilitarian won’t cut it these days with respect to attracting clients *or* employees. The visual appeal of such finishes as Dryvit’s Custom Brick, Limestone™ and TerraNeo in overcladding applications is obvious; combine that attraction with the lower installed cost and increased life cycle of these systems when measured against the traditional materials they mimic, as well as their lighter weight and energy efficiency, and there may be much to gain from overcladding your building’s existing EIF system. ☀

Building Owners’ Motivation to Overclad

A recently released survey, *Modernization and New Construction Trends in the Buildings Market* by *Buildings* magazine, outlines a variety of topics that affect subscribers’ purchasing decisions. (As an FYI: The subscriber base comprises 72,000-plus senior- and middle-level building

ownership and facilities management professionals.) Based upon a response of “EIFS” when subscribers were asked, “please check all the products you intend to purchase for your modernization or new construction projects in the next 24 months”:

49.5% noted building image as a factor influencing their need to modernize.

41.5% noted building image as a factor influencing their need for new construction.



All EIFS Are Not Equal

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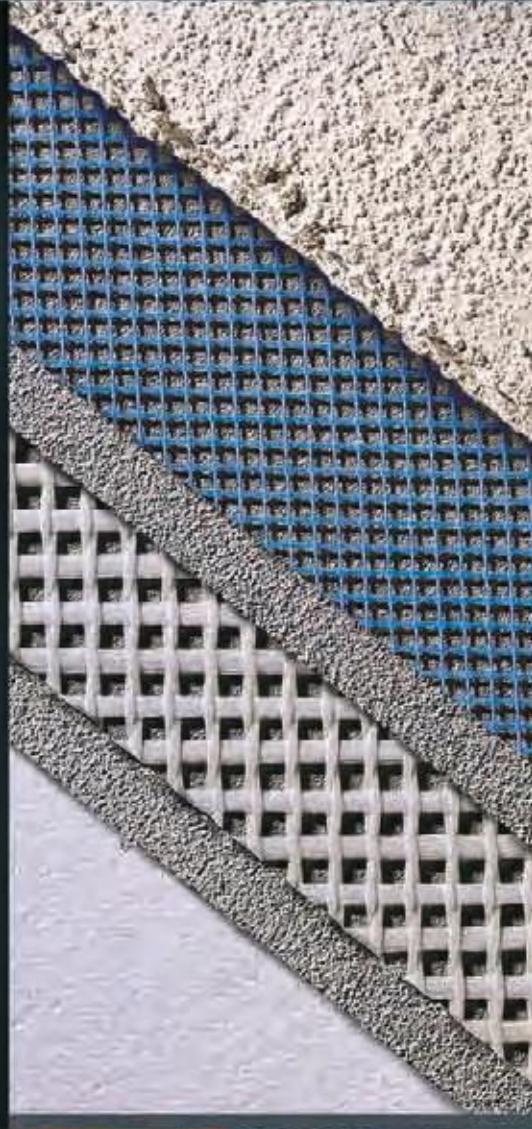
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Saving Face:

Sealant Selection, Installation and Maintenance are Critical to Long-Term Building Integrity and Appearance

By Kyle Miller



Over time, climate, pollution and building age can contribute to serious threats affecting all types of structures. Joint sealants used to weatherproof the gap between adjacent wall materials, like other building envelope components such as the roofing system or the windows, do not have an infinite service life. In addition to the rigors of directly being exposed to the elements on a daily basis, they must withstand building movement as well. Cracking, crazing, oxidation, separation from the wall material and other forms of breakdown may result, requiring maintenance and, eventually, total building joint seal restoration.

Sealant life expectancy is a function of a number of variables. These variables include type and quality of sealant, quality of sealant application and building design, as well as movement, location and maintenance and environmental issues. When not addressed, sealants may no longer provide adequate weatherproofing, allowing air and moisture to enter the structure. Once water infiltrates the building, major problems can result, first cosmetically and then structurally. By the time a stain shows up on the interior of a building, irreversible damage may have been caused to the exterior. For this reason, it is critical that building seals be approached as a preventive maintenance item. Annual inspections should be done to allow early detection and correction of localized problems, thereby maximizing the service life of all components and saving the façade from damage.

Protecting the Beauty of EIFS

EIFS provides a wide range of benefits, including superior energy efficiency and virtually unlim-



The selection of a sealant that has greater adhesive and cohesive strength than the cohesive strength of the substrate combined with excessive building movement may result in substrate failure where the substrate may become embedded in the sealant surface.

ited design flexibility. The multi-layered, composite construction of EIFS – with the insulation board secured to the exterior wall surface and durable, water-resistant base coat applied on top – provides some challenges when it comes to sealant installation and restoration. The light weight of the cladding and appearance of stucco or stone allows all sorts of exterior architectural detailing that would be cost prohibitive with conventional construction. In addition, EIFS rarely needs painting, retains its original appearance over time and is resilient enough to “absorb” building movement.

Being a lightweight material, however, EIFS is not as “robust” as other materials. The force used to remove original sealants in other claddings could possibly damage the EIFS to the point that the EIFS itself, not just the sealant, would need to be

repaired. In addition, EIFS contains acrylic resins within the finish and base coat, making these areas sensitive to some manmade chemicals. Using harsh chemicals and solvents to dissolve any sealant residue during the removal and cleaning of a joint could attack the resins in the EIFS lamina and possibly even leach through to the insulation, impacting the ability of a new sealant to bond to the original EIFS surface.

Whether at time of installation or at time of replacement, the quality of sealant used should be given serious consideration. Many types of sealants are available, each with different performance characteristics and costs. Since replacement of sealant in EIFS can be time consuming and requires special care and attention, selection of a high-performance sealant with a longer life expectancy may be prudent. Silicones are available as a low modulus product, which is ideal for use with EIFS because they reduce the amount of stress on bond lines. The high-performance, higher-cost silicone sealants generally come with a 20-year warranty, while urethanes typically offer a five-year warranty.

New advances in silicone sealant technology have resulted in revolutionary polymeric systems, which offer the exceptional weather resistance of silicones, virtually eliminate dirt pickup and stain-

ing and provide an easier-to-install product. Field-tintable silicone sealants based on the same technology are also now available in 70 standard colors, allowing tremendous flexibility when it comes to repairs.

Depending on performance and budget requirements, yet another option has been developed in recent years based on what is known as "spur" technology. These hybrid products offer a middle ground between urethanes and silicones, with better UV resistance than urethanes, the ability to be painted, a 10-year warranty and, depending on the manufacturer, a lower price point than silicones.

Where cost is a consideration and appearance is not the primary concern, an ultra-low modulus preformed silicone extrusion may be placed over the joint to form a watertight seal.

Identifying Joint Sealant Failures

There are a number of direct and indirect causes for sealant failure, including:

Sealant adhesive bond loss. The sealant pulls away from the material to which it is intended to bond. Sealant performance is very dependent on substrate preparation. Adhesion loss can result from improper substrate preparation, contamination or improper installation. Dirt, oil or form release agents will prevent good adhesion. The wrong primer or contamination will result in failure, too. Improper sealant installation may include incorrect width-to-depth ratios and three-sided adhesion, which doesn't allow the sealant to stretch and compress. Chemical incompatibility with the substrate may also be the source of problems.

Sealant cohesive tearing. The sealant is split within itself. Sealant cohesive tearing usually results from joint movement being greater than the movement capability of the sealant or from improperly installed sealant. Bead profiles that are too thin have a tendency to easily tear or split. If they are too thick,

they increase bond line stress, decreasing movement capability and resulting in tears and splits.

Substrate failure. In order for the substrate to fail,



If sealant is installed improperly or the joint movement is greater than the movement capability of the sealant, the potential exists for the sealant to split within itself.

the adhesive and cohesive strength of the sealant must be greater than the cohesive strength of the substrate. Joint failures of this type usually appear at first glance to be sealant adhesive bond loss. Close examination of the bond line shows that the substrate is embedded in the sealant surface. Prolonged water exposure and/or freeze-thaw can also be the cause.

Discoloration, disintegration or hardening of sealant. These may be indicators of sealant incompatibility with the substrate, contamination or an inability to weather the elements.

Excessive dirt pickup. While some dirt pick-up is common to some silicones and other sealant types, dirt pick-up may also be an indication of uncured sealant.

Frequently, joint seal failures result from indirect causes and will not be corrected by replacing the joint sealant alone. Poor-quality windows that leak infiltrated water into a wall system may appear to be sealant problems. Building settlement or other one-time movement (such as seismic racking) often causes joints to move more than anticipated.

Choosing the Right Option

Joint sealant restoration can include spot repair, total removal and replacement or a bridge joint approach. When the majority of the seals are in good condition, the most economical solution is to seal the immediate problem area only. When it is determined that localized repair will not prevent the possibility of further failure, total building joint seal restoration should be undertaken (as well as when the sealant is approaching the end of its projected service life).

Repairing EIFS sealant joints usually means removing the old sealant and replacing it with new sealant, but care must be taken so as not to damage the EIFS. Finding a balance between complete sealant removal and maintaining the integrity of the EIFS makes remediation of this substrate a delicate proposition. Sometimes, the sealant has lost its bond to the EIFS and can be pulled out without difficulty. More often, however, there are areas that are loose as well as some that are still firmly attached. The textured nature of the EIFS also allows sealant to enter ridges and nooks formed

in the coating and it is difficult to remove sealant in these areas (joint cavities are also frequently narrow and don't allow much room for the tools used to remove the sealant). Forcing a well-attached sealant bead from the joint will probably wind up bringing some of the EIFS with it and requiring that the EIFS itself be repaired before proceeding.

With EIFS, it is generally not possible to completely remove the existing sealant without causing damage to the EIFS surface. When the existing sealant is still well-bonded to the EIFS, partial removal is done. A "V" notch can be cut into the existing sealant, allowing a segment of the existing sealant to be removed. In these cases, a $\frac{1}{16}$ - to $\frac{1}{8}$ -inch thickness of old sealant is left at the bond line so as not to create stress, and a sealant compatible with the old sealant must be used for restoration.

The surface to which the replacement sealant will be applied must be clean, dry and contaminant-free. Some sealants require a primer application to obtain strong and consistent adhesion to the substrate and/or to the old sealant. Installation of the new sealant should only proceed when substrate temperatures are 40 degrees F. or above. At substrate temperatures below this, condensation and frost can readily develop.

In applications where cost is an issue or it is not feasible to completely remove the existing butt joint material and the substrate cannot be restored to virgin-like conditions, a bridge joint can also be applied over the top of the old joint with the new joint adhering to the face of the building. Some bridge joints are ultra-low modulus preformed silicone extrusions, which may be placed over the joint to form a watertight seal. The extrusion selected should be a minimum of $\frac{3}{4}$ -inch wider than the joint and must be embedded into wet sealant applied to either side of the joint. This approach may not be a viable alternative if aesthetics are of concern. ☀

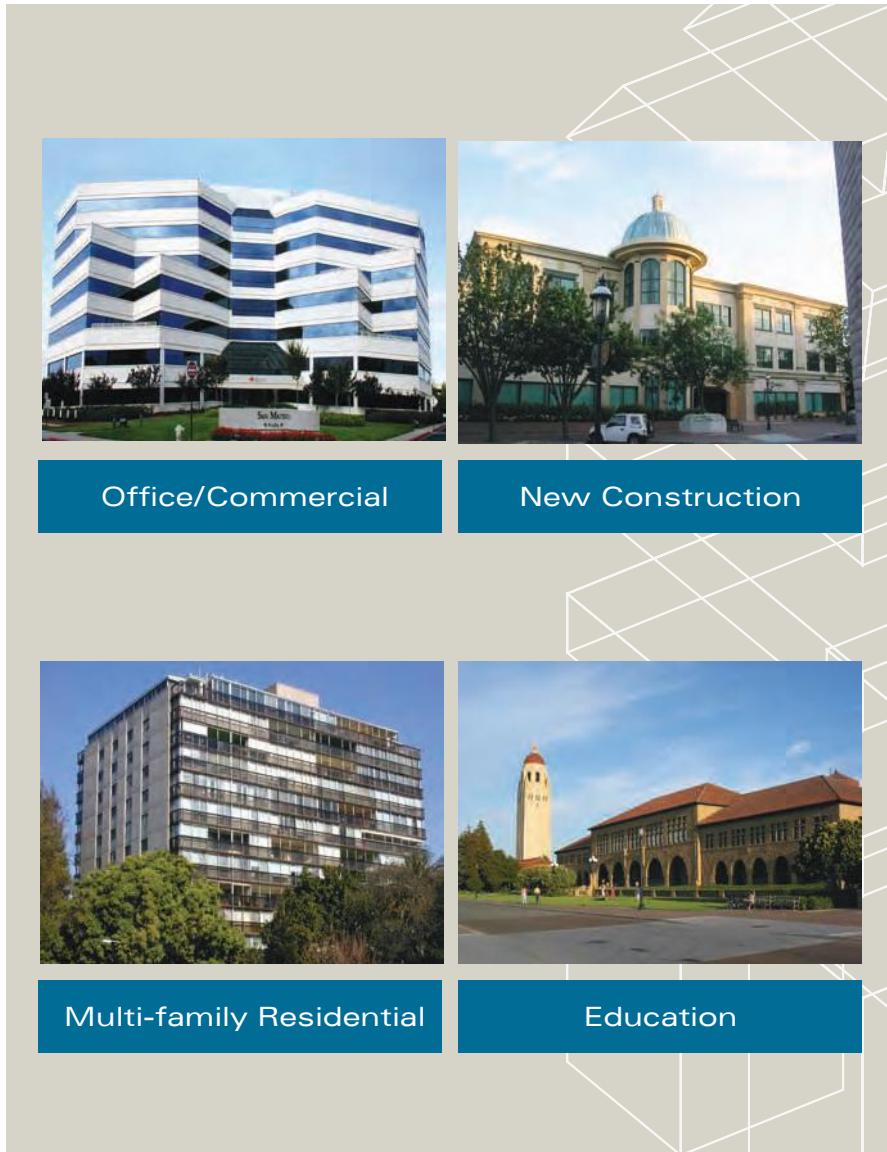


As joint sealants approach the end of their life expectancy, they will begin to show effects of degradation, such as cracking, crazing and oxidation from environmental factors.

Kyle Miller is technical coordinator, sales force and distributor development, at Beachwood, OH-based Tremco Commercial Sealants & Waterproofing (www.tremcosealants.com).

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Build Green – Save Green:

A Case for Dryvit® Outsulation® Systems

By Tony Stall



The foremost topic of conversation today is “green,” and the construction world is certainly no exception to this. Three major factors that largely determine just how “green” a building will be are the *construction costs*, dominated by land acquisition, design and physically erecting the structure; the *operating costs*, which include all HVAC functions for the lifetime of the building; and the *environmental costs*, specifically, the impact that constructing and operating the building collectively yields in terms of material consumption, waste and energy use.

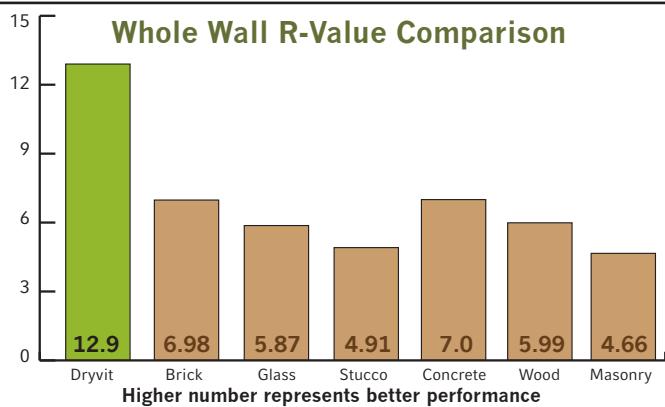
In today’s increasingly competitive building environment – one in which the environmental implications of construction are now larger in importance – building owners, architects and contractors are equally concerned, not just with these costs, but also the environmental legacy left behind by the decisions they make. Insofar as the exterior cladding of the building is concerned, there is substantial and highly accredited third-party evidence to support the compelling case that EIF systems offer the best solution for that part of the building equation.

Construction Costs: The Initial Investment

The specification of an exterior cladding material or system is typically dictated by the desired final appearance of the building; however, once designed and bid upon, planned buildings are often “over budget” and the (oft-dreaded) “value engineering” phase begins. At times, this process can be heavy on value, but light on engineering. This can often result in changing the type and, hence, the performance characteristics of various building components, including the substitution of cladding materials. Given the performance characteristics of a Dryvit Outsulation System as a building cladding throughout its life cycle, however, you get both outstanding value and engineering.

In a landmark case study, the Nashville, TN, architectural firm Lyman, Davidson, Dooley LLC concluded that *more than 10 percent of “core and shell” construction costs could be saved on a three-story office building by substituting Dryvit’s Outsulation System for masonry*. Money was saved on the size of footings, structural and framing steel and HVAC equipment simply by replacing the heavier, less energy-efficient masonry cladding materials with the Dryvit Outsulation System. Significantly, by using specialty finishes from Dryvit (such as Custom Brick, TerraNeo and Limestone), the physical appearance of the building was maintained as originally designed. The total savings amounted to more than \$570,000 and slashed two months off the original construction schedule as well. This type of value engineering allows the owner/developer company many options, among which might be to increase the floor space of the project, purchase more equipment for interior fixtures or

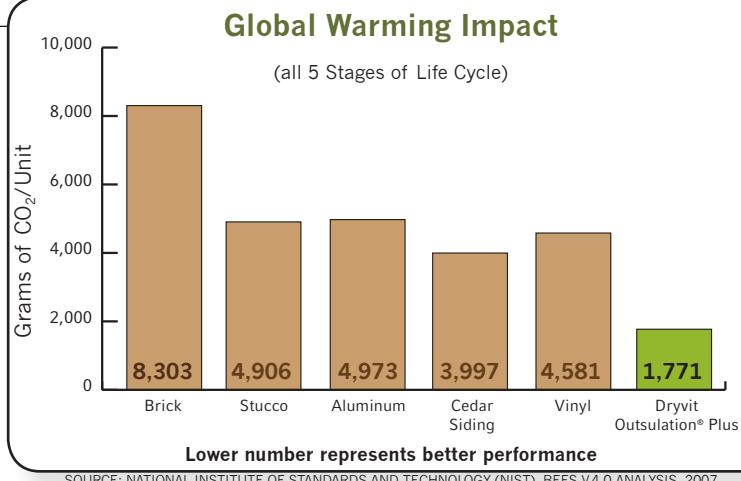
DIAGRAM 1
Whole Wall R-Value Comparison



continued, page 24

upgrade other elements of the building. The developer/owner might even choose to simply pocket the difference and invest the money for future use. No matter the choice, lowering the initial construction costs by using Dryvit Outsulation systems creates real value without any sacrifice in appearance or engineered performance.

DIAGRAM 2



SOURCE: NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST), BEES V.4.0 ANALYSIS, 2007

Operating Costs: The Annual Accrued Savings

The Lyman, Davidson, Dooley analysis quantifies what many construction professionals have long known: Building with a Dryvit Outsulation System represents excellent initial value for the money. However, this is just the first chapter of the story. Inherent as well in Dryvit Outsulation systems are unique energy-efficiency benefits that meaningfully impact the operating costs of a building for its entire lifetime.

The Oak Ridge National Laboratory (ORNL), the leading U.S. independent research laboratory operated by the Department of Energy (DOE), performed whole wall energy-efficiency evaluations on six commonly used claddings in identical laboratory settings. *The Dryvit Outsulation systems tested were 84 percent more energy efficient than the next-best performing cladding* (see Diagram 1, page 22). This substantially superior energy efficiency translates into annual savings every year the building is occupied – on average, between 20 and 30 percent. The significant dollars saved compound rapidly over the typical 50-year life of the building and can be reinvested in technological upgrades, systematic and necessary maintenance or in new projects. Maintenance is critical to a building's long-term performance, but this type of work is often left under bud-

geted or ignored completely, especially as building stewardship transfers from one owner to the next. Programmed reinvestment of dollars saved by reduced energy costs is a practical and cost-effective method of ensuring a structure's long-term efficacy.

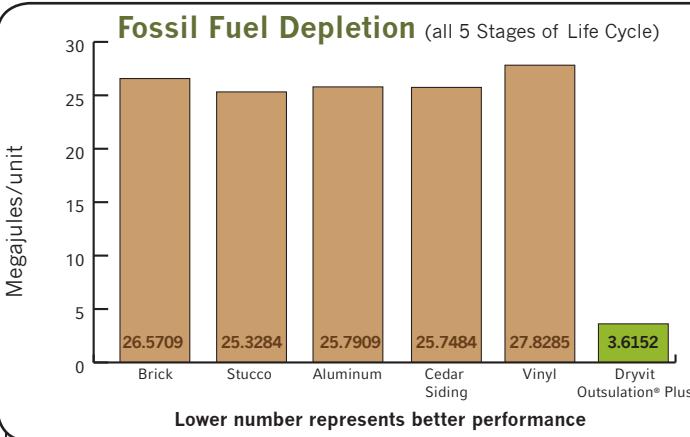
The use of insulation on the *outside* of the wall may sound contradictory, but is, in fact, the fundamental concept on which Dryvit's cladding system name – Outsulation – is derived. The energy efficiency of exterior insulation and finish systems is provided by the Expanded Polystyrene insulation board used, increasing arithmetically with its thickness. This approach (exterior insulation) has been described by such respected associations as the Canadian Mortgage and Housing Corporation as the optimal cladding to use in steel-framed construction, both because of its attainable energy efficiency as well as its reduction in the potentially damaging effects of thermal bridging that can occur in those types of structures. In the public sector, the Massachusetts State Building Code now requires this configuration on all steel-framed structures, and other states are considering similar legislation. The Federal government has also dictated that energy conservation measures be enacted rapidly in the years ahead. The use of exterior insulation, pioneered by Dryvit in 1969, is clearly validated by such pronouncements.

Saving money through energy efficiency is only a part of the complete green building equation. The non-pecuniary, but equally meaningful, environmental significance must also be considered. When fossil fuels (such as those used to heat and cool buildings) are burned, large amounts of potentially harmful gases (notably, carbon dioxide and sulfur dioxide) are produced and released into the atmosphere. As such, cladding materials need to be evaluated not only by their financially related initial and operating costs, but by the impact they make on the environment – *throughout their life cycle*.



ALL PHOTOS: COURTESY OF DRYVIT SYSTEMS, INC.

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SOURCE: NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST), BEES V.4.0 ANALYSIS, 2007

The short answer is that a two-year-long NIST analysis, which evaluated Dryvit's Outsulation systems throughout the five stages of the life cycle, concluded that *Dryvit EIFS offers a substantially smaller carbon footprint than brick, stucco, aluminum, cedar siding and vinyl over the life cycle of the product.* Some details follow, and the full report can be obtained from Dryvit or viewed on NIST's BEES 4.0 software, which is used by over 20,000 building professionals worldwide.

Diagram 2 (page 24) summarizes that Dryvit Outsulation systems create nearly 80-percent LESS carbon dioxide (CO_2) – over the life cycle of the system – than brick, and significantly outperform several other claddings as well. A closer look reveals that Dryvit Outsulation systems use comparable levels of energy to other products in the “raw materials and manufacturing” stages of the life cycle, are equal to or far superior than other products in the “transportation” phase and easily best all other claddings throughout the 50-year “use” phase of the life cycle.

Similarly, comparable benefits are evidenced in the NIST findings when you examine the total fossil fuel depletion. Diagram 3 (above, left) shows that, while the other tested claddings all use about the same amount of fossil fuel over their life cycle, Dryvit Outsulation systems were found to be more than *seven times better* during an equivalent 50-year period of use. Why? Primarily, again, because of the terrific insulation properties afforded by Dryvit Outsulation systems.

The final life cycle stage (the “grave,” as some would describe it) considers the ultimate disposal or recycling potential of a product. What happens when it just wears out and can no longer function as designed and intended? Here again, the Dryvit Outsulation systems offer unique value. Through the DryvitCARE™ program, measures can be taken – both routine and affordable – that can keep the Outsulation system on the building for its entire life, looking beautiful and continuing to save on energy costs. With proper maintenance, the original system needs never to be removed or replaced. The look of the building may even be entirely changed by using new finishes that are compatible with the old exterior – enabling an owner company to upgrade or rebrand a building affordably and easily. ☀

Tony Stall is vice president, marketing, at West Warwick, RI-based Dryvit Systems, Inc. (www.dryvit.com).



With this in mind, it became imperative for Dryvit to determine whether the production of its Outsulation systems (including the EPS) consumed more energy than the savings gained by using them for the lifetime of a building. Could a Dryvit Outsulation system be a green product in spite of its individual components? What would its overall carbon footprint be as compared with other commonly used claddings? Dryvit asked the National Institute of Standards and Technology (NIST) to answer these questions.



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Dryvit Outsulation® systems are the ideal solution for the environmentally and energy conscious because our CO₂ footprint is significantly smaller than other commonly used claddings such as stucco and brick.

Don't believe it? Ask the scientists at the Oak Ridge National Laboratory – one of the nation's leading independent testing facilities. In whole wall R-Value comparisons, Dryvit Outsulation systems were determined to be at least 84% more energy efficient than six other commonly used claddings, including stucco, brick, concrete, wood, vinyl and glass.

But there is more. The National Institute of Standards and Technology (NIST) has evaluated the CO₂ footprint of Dryvit through all the phases of Life Cycle Analysis – including raw material production, transportation, and use – and found that, overall, Dryvit Outsulation systems contributed much less CO₂ than stucco or brick over the life of the building.

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