

TESS™

Thinset Exterior Surfacing System

How an innovative and environmentally friendly surface cladding material provides a longer lasting, cost-effective, high-performance alternative to both acrylic and traditional stucco products

A Formulated Solutions White Paper



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Executive Summary

Situation: Existing Acrylic and Stucco-based Cladding Solutions No Longer Meet the Needs of Today's Building Construction Industry.

EIFS (Exterior Insulation and Finish Systems) and traditional stucco are two exterior surface cladding materials that have been widely used on both commercial and residential structures over the past thirty years. EIFS is a synthetic acrylic paint-like product with texture, while traditional stucco is a thick cementitious product with an extensive history in the construction industry. While both products have positive benefits, they also have significant limitations that range from a failure to manage water vapor and moisture to a lack of resilience that leads to cracking, and the failure to prevent the spread of dangerous mold and bacterial growth. These limitations result in higher costs, a higher potential for lawsuits, and the potential for chemical leaching that can pollute surrounding groundwater. Because of these challenges and risks, many leading experts believe that these materials no longer meet the needs of today's building and construction industries.

Problem: EIFS Water-Impermeable Design Creates Significant Environmental, Mold, and Microbial Problems That Increase the Potential for Greater Liability and Greater Costs.

As an acrylic-based product, EIFS finish is water repellent. Cladding a building with EIFS is akin to placing a plastic sheet around the entire building encapsulating it and preventing it from breathing. After water and moisture enter that building structure via a variety of openings around windows, doorframes, edgings, caulking, and walls as the result of typical seasonal weather activity, the hydro-impervious nature of EIFS acrylic stucco does not allow that moisture to escape. The combination of a warm, humid environment and the entrapped moisture results in interior building damage and the subsequent development of black mold that creates a potential consumer health crisis. As a result, devel-

opers that have used the EIFS cladding material have seen a number of class action lawsuits filed against them.

Solution: TESS Finish: An Innovative Cement-based Cladding Solution That Provides the Combined Benefits of Both Acrylic and Cementitious Materials While Avoiding Their Inherent Limitations.

TESS Thinsset Exterior Surfacing System is a highly decorative, long-lasting exterior cladding material for new or existing residential and commercial buildings. This new system advances the state of the art in exterior cladding. TESS Finish addresses the problems that the construction industry has indicated are inherent with both EIFS and traditional stucco cladding materials.

TESS Finish combines the strength and environmental benefits of Portland cement stucco along with the aesthetic appearance and beauty that is commonly associated with an acrylic-based EIFS product. Finally, it has a competitive price as compared with other exterior cladding materials such as EIFS, brick, cement block or vinyl siding.

Under a blind test, two leading brands of acrylic EIFS finishes were compared with TESS Finish in a Moisture Vapor Transmission Rate Test utilizing three test protocols: ASTM E96-95, D1653-93 and DIN 52615. The following results make clear the vast improvement TESS Finish provides over EIFS finishes.

EIFS specimen A	17.1 perms
EIFS specimen B	21.6 perms
TESS Finish specimen	72.1 perms

Table 1. Water Vapor Transmission

TESS Finish provided 3.3 to 4.2 times more water vapor transmission than the two leading EIFS brands.

Note: A perm is a unit of permeance or "water vapor transmission" given a certain differential in partial pressures on either side of a material or

membrane. Perms are expressed in grains of water vapor/hour/foot². Within this context, the higher the perms, the faster water vapor will ex-purgate or pass through and out of a wall.

Result: TESS Products Provide Greater Breathability, Durability, Ease of Application, Superior Long-lasting Anti-microbial Protection and Environmental Friendliness at a Lower Operating Cost.

The formula for TESS Finish uses materials that produce greater hydrophobicity or “water shedding” capabilities with breathability. Because of its vapor transmission quality, TESS Finish, when applied to the exterior of a building, forms an envelope that keeps the building insulated and warm in the winter as well as cool in the summer. Unlike an acrylic-based product, water vapor penetrating the building can also escape back out. Once dried, TESS Finish will not allow water to penetrate the building, but it will allow water vapor to diffuse and escape. This breathability feature allows expiration of moisture, while simultaneously providing more water repellency.

The innovative formula of TESS products also provides additional benefits, which include extensive durability, easier application properties, and built-in antimicrobial agents with “green” attributes that are better for the environment.

Existing Exterior Cladding Solutions No Longer Meet Current Industry Needs

The construction industry frequently uses the terms “coating” and “finishes” interchangeably, but the two words have vastly different meanings. “Coating” refers to the application of paints, stains or other sprayable and/or rollable materials that adds color to a base surface. “Finish,” on the other hand, is either sprayed or troweled onto an exterior surface and adds both color and texture to the surface.

To date, building contractors have had two pri-

mary choices for exterior cladding finishes: Traditional Stucco and EIFS (Exterior Insulation and Finish Systems). Each of these solutions has its own unique set of advantages but also an inherent set of limitations and problems.

EIFS is an exterior cladding material that has been widely used on both commercial and residential structures since the 1980s. EIFS is a man-made, exterior acrylic paint combined with a texturing substance (such as sand), a reinforcing mesh, a cementitious base coat used to bond the mesh to an insulator such as polystyrene foam board, and an adhesive or mechanical fasteners to bind the insulator to the building. The EIFS acrylic is a thick paint-like product, which requires troweling to expose its textured finish.

While EIFS has certain benefits such as cost,

Both EIFS and traditional stucco have their own unique set of advantages but also an inherent set of limitations and problems

color choice, and a greater number of texturing options, it also has many drawbacks. Most important, its water-impermeable properties entrap water vapor and moisture inside walls, increasing the potential for rotting interior walls and the growth of dangerous mold spores. In addition, environmentally unfriendly poisons that are included to kill bacteria tend to leach and pollute surrounding groundwater, increasing the potential for expensive litigation. With today’s stringent environmental regulations, the risks associated with using EIFS far outweigh its limited number of advantages.

The other cladding alternative, traditional stucco is a cementitious product that has its own set of benefits and challenges. As a cement-based product, stucco is a water-permeable, environmentally friendly, and a historically proven material. On the downside, the thick-

application requirements associated with traditional stucco increase the potential for cracking, diminished longevity, and require installers with specialized skills to create a good-looking, professional finish.

Given the inherent limitations of both of these cladding materials, building contractors are looking for a new alternative that combines the benefits of both technologies but avoids their inherent limitations, productivity challenges, and environmental hazards that increase risks and decrease effectiveness.

Today a new and innovative exterior surface cladding material called TESS (Thinset Exterior Surfacing System) is now available. TESS Finish combines the benefits of EIFS coloring and texturing, along with a unique ability to convey water vapor through the wall out of the building. Its environmentally friendly qualities are inherent and consistent with cement-based traditional stuccos.

The purpose of this white paper from Formulated Solutions is to educate building material suppliers, contractors, architects, and customers about the limitations of existing surface cladding materials such as EIFS and traditional stucco. In addition, this white paper will discuss how the TESS surfacing system provides a superior alternative as the next generation in architectural surface cladding technology.

Understanding the Challenges with EIFS and Traditional Stucco Surface Cladding Materials

Given the widespread use of both EIFS and traditional stucco in both commercial and residential construction projects, it is important for building contractors and residential developers to better understand the problems and risks that are associated with their continued use as an exterior cladding material.

First, there are five challenges associated with the use of EIFS as a surface cladding technology:

1. **Water and Moisture Entrapment**

— As an acrylic-based product, EIFS finish is designed to be water repellent. Covering a building with EIFS is akin to encapsulating the entire building in a plastic sheet or envelope. When water and moisture enter that building structure via openings around windows, doorframes, edgings, caulking, and walls as the result of seasonal weather activity, the hydro-impervious nature of EIFS acrylic stucco does not allow moisture to escape. The combination of a warm, humid environment and trapped moisture results in interior building damage and the latent development of black mold, creating a potential consumer health crisis.

2. **Limited Durability** — The EIFS exterior cladding material comprises an acrylic-based paint combined with a textured material such as sand. Just like other types of paints used on commercial and residential exterior surfaces, EIFS is a petroleum-based product, which causes it to fade, erode, and degrade over time when exposed to ultraviolet light and weather-related elements.

3. **Increased Toxicity** — The EIFS acrylic material contains petroleum-based plastic particles in an emulsion that are combined with other chemicals including surfactants and solvents to form the acrylic paint portion of the product. These minute particles reside in the paint film and over time leach out into surrounding sewer systems, groundwater, and ultimately the water table. Besides these toxic plastic particles, EIFS often contains toxic coalescent solvents that can similarly leach into surrounding soil and water tables.

In addition, mold and microbes develop when the substance they are living on provides them with the nutrients they need to survive and grow. To counter this effect, EIFS includes antimicrobial agents that act as a poison, killing off harmful bacteria and mold before they can develop and grow. Unfortunately, when these poisons leach off or exude from the surface and enter soil and

groundwater, they can pollute the environment, making it hazardous for humans, pets, and other animals alike.

The hydro-impervious nature of EIFS acrylic stucco does not allow moisture to escape

4. **Antimicrobial Degradation** – Antimicrobial pesticides are substances or mixtures of substances used to destroy or suppress the growth of harmful microorganisms such as bacteria, viruses, or fungi on inanimate objects and surfaces. EIFS contains antimicrobials that thwart the growth of these microbes, often contain mercury, and are poisonous to life. Since synthetic materials break down after long periods of UV exposure, these antimicrobial pesticides can degrade as part of the paint, which leads to two critical problems:

- Toxic contamination of the groundwater and the surrounding environment from runoff, and
- The depletion of the efficacy of the built-in pesticides within two years or less, which results in a lack of residual bacterial protection in the finish thereby leaving building walls unprotected and subject to mildew, mold and other bacterial growth.

5. **High Operating Costs** – There are several factors that result in higher operating costs when EIFS is used as a surface cladding material:

- Lower Yield/More Material Required – EIFS has a higher material consumption rate when applied to the same unit area. As a result, EIFS produces a lower yield, that is, the square footage of wall covered per gallon of finish used.
- High Shipping and Storage Costs – As the amount of material used for a surfacing project increases, the builder in-

curs higher related shipping and storage costs. In its native package, EIFS weighs approximately 60% more than equivalent cladding finishes. These two aspects cost developers 50% more in related freight and storage costs than competing cladding materials.

- Greater Waste/Droppage – During a surfacing project, material droppage is a frequent problem. Every time contractors apply EIFS, they will inevitably drop a portion of that material on the ground, which can often require approximately 5% more material to compensate for the loss.
- Costly Cleanup Procedures – Dropped material also creates a cleanup problem. When a project is completed, sticky EIFS material left on the ground will harden, and can require scraping or power washing to remove the material from floors or equipment it fell on. This adds additional time and labor costs to the project.

Another alternative for surface cladding is the application of traditional stucco. Traditional stucco is a cementitious-based material that has been relatively unchanged for thousands of years, dating back to the era of the Roman Empire. In fact, as a testament to the material's durability, many cement-based structures from that era are still standing today.

Stucco is the common name for Portland cement plaster, formed by mixing sand, cement, lime and water, and applied to either interior or exterior building wall surfaces. Contractors use a trowel to apply stucco to masonry walls, concrete blocks or framing with a wire lath backing. However, unlike the acrylic-based EIFS, traditional stucco is a cement-based product, resulting in a more breathable material that can transmit water vapor.

As with EIFS, there are several distinct challenges

associated with the use of traditional stucco cladding materials:

1. **High Consumption Rate** – Traditional stucco uses a significant amount of material to form an effective cladding surface, needing from three to five layers of stucco material with each layer requiring at least a $\frac{3}{16}$ " thick application. This large amount of material increases transportation and storage requirements to ship and house the material and requires additional labor to install the product, increasing the overall costs of the project. This also adds considerable weight to a building's structure.
2. **Increased Cracking Risk** – Since it is an inflexible thick-cement material, traditional stucco is very rigid. With each additional layer, the added thickness increases the potential for cracking. Over time, hairline cracks frequently appear as the result of ground vibration, foundation settlement and thermal shock from expansion and contraction. This is especially true during winter months when water running through these cracks can freeze and expand, promoting further and ever widening cracks.
3. **Limited Texture Options** – The thick properties associated with traditional stucco make it difficult to apply a variety of textures to the wall surface. When stucco is applied, the contractor must create the specific texture through troweling techniques to form lines and swirls within the material. The difficulty and limitations associated with this task requires extensive contractor experience to give the wall a professional look, a skill set that fewer and fewer contractors possess.
4. **Increased Colorization and Residue** – As a cementitious product, traditional stucco has a naturally dull or matte finish, which limits its appeal compared to the glossy nature of acrylic EIFS. Traditional stucco is also prone to efflorescence, or the white chalky film residue that often appears on the stucco surface over time. Efflorescence is the crystallization that forms when water present in stucco evapo-

rates leaving dried, hydrated or solvated salt after exposure to the air. This is more of an aesthetic rather than a structural concern.

5. **Lack of Long Term Antimicrobial and Mold Protection** – As a natural cementitious product, traditional stucco is a breathable substance when it comes to the intrusion of water vapor and moisture. However, water carries bacteria and once bacteria or mold begins to form on its surface, traditional stucco lacks any means of either killing the bacteria or mold or stopping its growth.

Given the vast number of challenges associated with using both EIFS and traditional stucco for surface cladding, building contractors, developers, and residents are now seeking a new alternative that combines the benefits of both technologies without their inherent limitations. Today, a new and innovative cladding technology is now available that combines the water vapor-permeability and environmentally positive benefits of traditional stucco with the attractive look and ease of use associated with acrylic EIFS material. This new and innovative product is "TESS".

A New and Innovative Approach: The Advantages of the TESS Exterior Cladding Solution

TESS Thinset Exterior Surfacing System is an innovative and highly decorative, long-lasting exterior cladding material for new or existing residential and commercial buildings.

TESS products address the problems that are inherent with both EIFS and traditional stucco cladding materials. The TESS system is a genuinely new cladding system designed from the ground up to advance the state of the art in exterior cladding.

Experts in the EIFS, Portland cement, and the tile mortar and grout industries developed TESS products. Based on that combined experience,

these industry pioneers envisioned a cement-based product that could pass the test of time and have the strength and environmental benefits of Portland cement along with the aesthetic appearance and beauty that is associated with an EIFS product. They also needed it to be competitively priced with other exterior materials such as brick, cement block, or vinyl siding. Lastly,

TESS products address the problems that are inherent with both EIFS and traditional stucco cladding materials

TESS systems provide an earth-friendly product with optimized “Green” qualities sought by owners, architects and designers alike and unmatched by ordinary EIFS products. TESS systems are the result of this extensive expertise and research.

There are six benefits associated with the TESS material that make it a superior cladding choice over either EIFS or traditional stucco:

1. **Superior Hydrophobic Qualities** — TESS Finish, based on Portland cement, is a naturally water-permeable product that provides greater hydrophobicity, or “water shedding” capabilities. Hydrophobic compounds do not dissolve easily in water and are usually non-polar, meaning that they take on qualities similar to those that allow petroleum and other hydrocarbon-based products to repel water when mixed together.

TESS Finish forms an envelope that keeps a building insulated and warm in the winter as well as cool in the summer. However, unlike acrylic-based products that hold back water, TESS Finish allows water vapor to escape. Once TESS Finish has dried, it will not allow liquid water to penetrate the building, but it will allow water vapor to diffuse and escape. We refer to this property as breathability. Simultaneously, TESS’ hydrophobic character provides greater water repellency. All of this happens on a microscopic level in a similar way that a fine

membrane mesh blocks liquid water but allows the transmission of water vapor.

TESS’ water repellency also provides superior dirt pickup resistance. Rain or snow contains pollutants or dirt that deposits a dirty residue onto a surface as the moisture evaporates. This is what occurs when rain carries dirt onto the exterior surface of a building. When the moisture evaporates, the remaining dirt residue is deposited and absorbed into the wall surface. TESS Finish has a built-in, dirt-pickup-resistance feature that prevents the exterior wall from becoming dirty as other competing surface cladding products do. Some EIFS products offer this feature as well, but generally at an additional premium.

2. **Extensive Durability** — Polymer modification gives TESS Finish greater elasticity and flexibility. This “elastomeric” capability allows TESS Finish to bridge small cracks in the substrate and resist cracking from thermal shock and natural building vibration or settlement. This property combined with the hardening benefits of cement gives TESS Finish a superior level of protection from temperature-imposed cracking.

Acrylic cladding materials such as EIFS break down and decompose over a relatively short amount of time, but the cementitious durability of TESS products ensure long-lasting protection so that homeowners do not have to replace or repair the material. Finally, since TESS Finish is not an acrylic material, it does not leave a chalky paint residue as EIFS products sometimes do.

3. **Improved Application Qualities** — Traditional stucco must be thickly applied in several layers, as compared to a TESS system, which is applied in only one thin coat, and can be as little as 1mm to 3mm thick in application. TESS Finish also has a buttery, creamy quality, ensuring that more of the material will stay on the trowel without any subsequent material dropage. Since it is not as sticky as other cladding compounds, any dropped TESS material is easily swept up or power washed. This ensures that



there will be a minimum of material waste, requiring simple cleanup procedures, and a minimum of labor and time lost when compared to EIFS or traditional stucco installations.

Finally, TESS Finish has a rapid drying feature, which means that it is continuously hardening after it is applied to a surface. Two-person teams apply TESS Finish working alongside one another. The first worker applies TESS Finish, while the second smooths out the finish, creating uniformity. Using a float trowel, the follow-up installer exposes one of the four textures that the product comes in by simply rubbing his trowel in a circular motion over the finish. This rapid drying capability encourages the construction team to work more closely together, improving productivity, lowering completion time, and reducing the project's total labor costs.

4. **Toxic and Microbial Repellent** — Unlike acrylic materials, which include polymers containing residual monomer (a dangerous petroleum by-product), solvents, and a host of synthetic, petroleum-based chemicals that can leach into surrounding bodies of water, TESS products contain no harmful compounds that can pollute groundwater and soil. Instead, TESS Finish employs an exclusive, multi-functional, inorganic, zero VOC, modified barium metaborate agent that has been safely used for over 50 years throughout the world in consumer and professional coatings, inks, adhesives, grouts and related industries to provide the following properties:

- Long term fungus resistance
- Package preservation and enzyme inhibition
- Corrosion resistance
- Chalk resistance
- Increased color retention
- Protection against UV degradation
- Stain resistance
- Fire retardation

Because it is an inorganic composition with minimal solubility, the TESS microbicide ranks as one of the safest available for human and environmental exposure. Its low leachability provides long-term protection when compared with organic biocides. TESS microbial functionality will not breakdown as a result of high heat, chemical attack, pH, or UV degradation, as seen by more system sensitive organic biocides commonly found in acrylic coatings and finishes like EIFS. Finishes that incorporate the TESS microbicide agent have protection against both mold and UV polymer degradation for over a twenty-year span. This material is the only EPA-registered modified barium metaborate on the market, which make it truly “one of a kind” within the construction industry today.

Finally, TESS systems utilize a moisture barrier/drainage membrane that further eliminates the danger of moisture penetration in to the interior walls, along with a powerful long-lasting, antimicrobial agent that prevents harmful microorganisms from thriving on the surface of any building or home. This antimicrobial agent repels microbes by not providing the nutrients they need to survive and grow. This is a different approach from that of EIFS, which incorporates an antimicrobial poison designed to kill bacteria. This two-step process of keeping water out and preventing the growth of mold or microbes ensures that TESS Finish will protect the inhabitants of a building from any harmful effects of long-term bacterial growth.

5. **A “Green” Product** — TESS systems is one of the greenest cladding systems on the market today. It uses inorganic, earthen materials comprising sand and Portland cement, which remain inert when mixed with water. While TESS products eventually erode over time, as does any product, it breaks down into particles of sand and stone, the basic elements found in concrete, which is an earthen, naturally green product. Therefore, any subse-

quent erosion of the TESS material would run off into the water table without polluting it.

In addition, as a nonpetroleum-based product, TESS Finish takes less energy to manufacture and is lighter in weight than traditional stucco, reducing not only related transportation and storage costs, but also the weight on the building's frame. Finally, TESS packaging uses recyclable, biodegradable paper bags instead of plastic buckets—used for most EIFS products—which take several hundred years to break down in a landfill.

6. Lower Operating Costs — TESS systems result in lower operating costs as compared to either EIFS or traditional stucco cladding materials in the following ways:

- **Higher Yield and Less Material Usage** — TESS technology imparts an exclusive rheology and surface tension, which produces greater yield, in other words, a larger wall surface covered per gallon of finish.
- **Lower Shipping and Storage Costs** — In its native package, TESS Finish weighs approximately 40% less than standard EIFS finishes. These two features result in a combined freight savings of up to 50% when compared with an ordinary EIFS product.
- **Less Material Waste/Droppage** — The use of TESS Finish results in less material wastage and droppage resulting in greater material cost savings per project.
- **Limited Cleanup Costs**— TESS Finish reduces any related costs associated with clean up procedures, solvents, tools, and labor, since there is much less material wasted in the application process.

Concluding Summary

New industry and consumer requirements, coupled with concerns over pollution, mold, related litigation by homeowners, and the increasing costs associated with petroleum-based products, are forcing many commercial construction companies and homebuilders to take a closer look at their use of EIFS and traditional stucco surface cladding materials.

TESS Thinset Exterior Surfacing Systems by Formulated Solutions is a superior surface cladding material that combines the benefits of both EIFS and traditional stucco without their inherent flaws. TESS products provide superior hydrophobic qualities, extensive durability, easier application properties, a built-in safe antimicrobial agent, and environmentally sound packaging. Overall and in many ways, TESS Finish is a greener product that is much safer for the environment.

To summarize, three business benefits associated with the use of TESS systems for surface cladding projects include:

- **Higher Performance** — The innovative formula inherent with TESS Finish ensures greater durability that prevents cracking, provides superior breathability for water vapor expiration, and enhanced antimicrobial protection that prevents the growth of mold and microbes.
- **Greater Value** — TESS Finish has many elements that are included with the product that would otherwise be optional and extra with other cladding products, such as the dirt pickup resistance, optimal antimicrobial support, and a fast-drying formula, which reduce the total cost of ownership for the product.
- **Greener Capabilities** — TESS products are “earth-friendly,” using materials and providing energy-related benefits that reduce transportation and storage costs, are non-polluting to soil and water tables, and allows use of recyclable materials such as paper bags instead of plastic containers.



Performance Property	TESS	EIFS	Traditional Stucco
Green Technology	✓	✗	✓
Green Packaging	✓	✗	✓
Flame and Smoke Resistance	✓	✗	✓
Impact Resistance	✓	✗	✓
UV Degradation, Yellowing	✓	✗	✓
Longevity	✓	✗	✓
Dirt Pickup Resistance	✓	extra cost	✗
Elastomeric	✓	extra cost	✗
Anti-Microbial Protection	✓	extra cost	✗
Crack Resistance	✓	✓	✗
Ease of Spread	✓	✓	✗
No Misting Required	✓	✓	✗
Color Tinting on Site	✓	✓	✗
Real vs Synthetic Appearance	✓	✗	✓
Wastage/Droppage	✓	✗	✓
Wash-out/Rain Protection	✓	✗	✗
Extended Winter Application	✓	✗	✗
Yield per Unit	✓	✗	✗
Low Freight Cost	✓	✗	✗
Lowest Installed Cost	✓	✗	✗

Table 2. TESS vs EIFS and Traditional Stucco

About Formulated Solutions

John Garuti Jr, a business professional with more than 30 years of experience in the construction product and ceramic tile industries, founded Formulated Solutions LLC in 2001. He is currently the president of Super-Tek Products, Inc., a highly respected manufacturing company supplying the ceramic tile and marble industries with setting adhesives, mortars, and grouts.

Formulated Solutions LLC had the express intent of “formulating unique solutions” for a vast number of construction applications. Formulated Solutions’ products such as TESS Finish are scientifically and application proven to provide significant added value for the company’s clients.

TESS products meet all building requirements codified by the International Code Council (ICC). The ICC is a membership association dedicated to building safety and fire prevention. It develops the codes used to construct residential and commercial buildings, including homes and schools. Most U.S. cities, counties, and states that adopt codes choose the International Codes developed by this organization. For further information, visit <http://www.iccsafe.org/>.

In addition, TESS Thinset Exterior Surfacing System provides the “greenest” exterior wall system in the marketplace today. A product is “green” when its application has either a minimal or a neutral impact on the environment or when it allows the elimination or substitution of potentially hazardous materials in building design. In order to quantify the “green” state of a project or a building, the USGBC (United States Green Building Council) created the LEED (Leadership in Energy and Environmental Design) point system. Building design and other engineering factors determine the point awards, based on the total number of points granted by LEED-accredited professionals. The TESS system for exterior walls in buildings offers the potential for a maximum of 25 points in LEED scoring, making it one of the leading green products in the construction industry. For further information, please visit the USGBC Web site at <http://www.usgbc.org/>.





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