Installing TESS™ Finish in a One Coat Stucco Application

Formulated Solutions, LLC
25-44 Borough Place
Woodside, NY 11377 USA
T 718 267 6380
F 718 204 6013
www.TessFinishes.com

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A Word from Management

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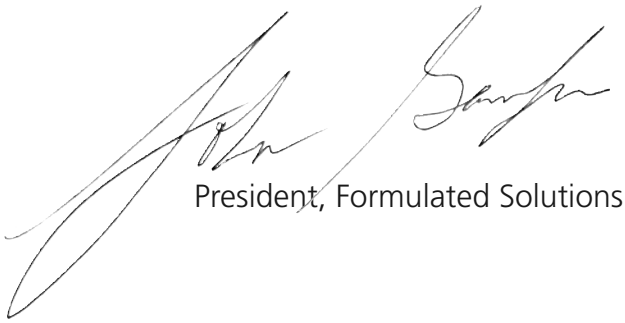
TESS™ Thinset Exterior Surfacing System is a sustainable, more efficient replacement for both traditional and synthetic (acrylic) stuccos. It preserves the natural beauty and textural variation of traditional stucco along with the economy and coloring of acrylic stuccos — without the well-known drawbacks of either. Best of all, TESS Finish can be used as a one coat stucco, or as the all-important finish to complete a sustainable EIFS-type system.

TESS Finish is our ground-breaking response to customer calls for a finish that eliminates water entrapment issues characteristic of acrylic stuccos. TESS technology naturally prevents a myriad of problems from ever arising — without any need for builders to learn unfamiliar new jobsite techniques or practices.

There are no new costs to incur, nor are there any new limitations to inhibit the design flexibility that sells. But there are substantial savings for everyone to appreciate; everything from our irreplaceable earthly environment to unnecessary damage control, waste, and shipping costs.

Formulated Solutions LLC introduced TESS™ Finish (patent pending) in late 2008, yet it is already becoming the product of choice among architects and builders who have used it, along with their clients and customers. TESS Finish is truly the "Next Generation in Architectural Finishes".

This installation handbook presents essential guidelines and information needed to manage a TESS job. It was compiled with the participation of our technical staff, field associates and colleagues. We want to provide as much information as possible to ensure that the professional installer achieves successful, first-class installations. We are committed to manufacturing excellence and innovation; your feedback from field experience provides valuable insight for future improvements. We welcome and appreciate your comments and suggestions. Please contact us through our website at www.TESSFinishes.com or at our offices in New York City.



President, Formulated Solutions LLC

Installing TESS™ Finish in a One Coat Stucco Application

Introduction

TESS Thinset Exterior Surfacing System is a new technology combining the most advanced and greenest innovations in the U.S. market today into one unique cladding system. This guide explains various methods to apply TESS Finish in a one coat stucco application. It imparts a general understanding of one coat stucco preparation and offers advice as to additional resources that may contain relevant, detailed information. TESS Finish is approved by the ICC (International Code Council) for One Coat Stucco applications referenced in the AC11 requirements. Though not guaranteed for completeness, this paper provides practical guidance for this type of installation and recommends valuable references to applicable codes and procedures including ASTM standards. It is not intended to substitute for specifications, code stipulations, published guidelines, manufacturers' instructions or good workmanship practices. Always consult all pertinent sources before commencing an installation. TESS Finish is installed by trained and certified applicators only; failure to follow this directive constitutes nullification of the product warranty.

Formulated Solutions LLC, the inventor and manufacturer of TESS products, is an active member of the US Green Building Council. TESS Finish is a patent pending technology.

Background

Modern stucco was made possible by the invention of Portland cement. Obtainable throughout the world, cement is doubtless the most versatile and ubiquitous building material known to man. In present-day use, stucco has kept pace with technology, reflecting changes in materials and application methods and evolving to meet the needs of different building conditions, innovative substrates, advances in material technologies and changing applicator demands.

Stucco describes a diversity of special claddings that provide distinct differences in their application and performance. Often they are designed to suit specific needs and conditions. Construction varies by region, therefore local building codes and architectural specifications should always govern a particular installation. As with any construction, there is no substitute for good workmanship and proper construction practice. Regardless of the materials used or the method applied, care in preparation will avert problems and will result in a sound, durable wall. Coordination and cooperation between the architect, builder and contractors in related trades is the best method of ensuring success in the final product.

A discussion of all the varieties, nuances or properties of various stuccos is not within

the scope of this guide. Rather, it is limited to the application of the "One Coat" system, or simply, "One Coat Stucco," as a preparation or base for the final coat of TESS Finish, which is placed on top of it. Aside from preparing masonry or framed walls to receive finish coat, this method of construction provides numerous benefits including protection against fire and the elements and fast, easy application. It also proffers an inexpensive approach to retrofitting buildings that need a face-lift.

Preparation

All product literature and MSDS(s) (Material Safety Data Sheets) must be available to the contractor and/or applicator prior to beginning work. Verify that all materials on the job site are correct, adequate, and properly stored. Bags should be stored in a cool, dry location, out of direct sunlight. Do not store bags directly in contact with the ground or concrete. Protect bags from weather and freezing. Scaffolding should be erected, as per OSHA safety regulations, the day prior to commencing work. Protect adjacent areas as necessary using masking tape and/or plastic coverings before work begins.

Framing & Substrates

Stucco is installed over a structural substrate. The two most common types of substrates are

- Framed walls with sheathing
- Concrete and masonry walls

Frame Walls with Sheathing

The most popular type of construction in the U.S. is sheathing over framed walls. A wide assortment of sheathings, or substrates, exists and may come in many forms. Sheathing materials are attached to a frame constructed of wood or steel studs. They are attached to this framework with nails or screws. Steel studs are generally used in commercial construction, whereas wood studs are more commonly seen in residential and light commercial work. Both types of stud are subject to minor movement due to temperature changes, settling of the structure and other external stresses. Wood studs can also twist or warp as they cure over time and dry out. Movement in the framing can translate through the wall in the form of buckling, bowing, cracking, etc. Such frame distortions can reveal itself in the finished coat in the form of cracks or other problems. Care should be taken to minimize all structural imperfections before cladding is installed.

Common substrates in the U.S. market includes: Exterior wood-based sheathing plywood, oriented strand board (OSB), gypsum sheathing in compliance with ASTM C 79, water-resistant exterior fiber-reinforced gypsum sheathing as per ASTM C 1278, glass mat faced gypsum sheathing in compliance with ASTM C 1278, and polyisocyanurate (iso-board) and expanded polystyrene foam board (EPS). All

substrates must be handled and installed as per code requirements and manufacturer's instructions. Failure to do so constitutes a nullification of the TESS Warranty. Other substrates can be used, but approval must be sought in writing from Formulated Solutions' Technical Department.

As with framework, care should be taken to ensure proper handling and installation of sheathing materials. Improperly installed sheathing may result in damage to the cladding. Sheathing also moves and may expand or contract with changes in temperature and humidity. Follow proper installation techniques to minimize the impact of these movements on the cladding. Adhere to sheathing manufacturers' instructions and code requirements for fastening and gapping between boards to ensure proper performance.

For further information, review ASTM C1280-90 Application of Gypsum Sheathing.

Before installing TESS One Coat Stucco over frame with sheathing construction, install a water drainage weather barrier and stainless steel lath meeting ASTM specifications. This is discussed in more detail in the section entitled Interconnected Wall Components.

Concrete Construction

In preparation for the finish, TESS One Coat Stucco is troweled or placed directly on top of concrete masonry units (called CMUs) or concrete block, poured-in-place concrete or tilt-up concrete walls. Proper construction and preparation of the concrete substrate ensures success. Concrete substrates must be clean and free from laitance, dirt and dust. Form release agents often remain on the surface after the poured concrete form is removed. Such release agents must be fully removed from the concrete or they may prevent adhesion of the One Coat Stucco to the concrete. Whenever adhesion appears questionable, ensure a strong bond between TESS One Coat Stucco and the wall by coating the substrate with TESS Additive and Bonding Agent. Follow instructions carefully to achieve maximum bond. Fresh concrete needs to cure before installation can begin. Uncured concrete walls are highly alkaline (possess high pH) and are identified as "hot." Placement of the stucco during a high pH or "hot" condition will impair the adhesion of the one coat stucco to the concrete substrate. The pH will dissipate as the poured wall cures over time. TESS Additive and Bonding Agent mitigates this condition permitting rapid application to proceed with confidence. If control joints or expansion joints have been used in the concrete construction, be sure that the one coat stucco has corresponding/coincident joints as required. Prudent preparation practices such as this generate trouble-free jobs.

For further information, review ASTM C932 Specification for Surface Applied Bonding Agents.

Open Frame Construction

When building paper and lath are fastened directly to the wall studs without sheathing, this is known as "open frame" construction. Application of TESS One Coat Stucco over open frame construction is the same as application over other substrates using lath. More on this method, further below.

Interconnected Wall Components

Weather Barriers Needed in Frame Construction

Weather barriers and water drainage membranes protect sheathings, framework and a building's interior from moisture that may enter from the environment. Moisture intrusion can come from any number of sources, including but not limited to: Improperly flashed roof capping and intersections; improperly caulked moldings, windows, doors and openings; improperly sealed plumbing or electrical penetrations; cracks or other points of incursion. Intrusion can occur in any type of structure regardless of the cladding. Proper caulking at penetrations and flashing at rooflines will prevent moisture incursion in to a building. Follow all code guidelines as well as manufacturers' instructions where applicable. Formulated Solutions LLC provides detail drawings that will help you determine the type and configuration of flashing appropriate for your situation. When doubt exists regarding proper flashing, get expert advice from the manufacturer whose materials you are using. It is fundamentally important to preclude or stop moisture intrusion wherever possible. However, some intrusion may occur despite precautions. Therefore, it is essential to allow water a means of "getting out" or evacuating. This is the fundamental, vital difference separating TESS Finish from all other acrylic finishes in the EIFS marketplace. TESS Finish breathes, acrylic finishes do not.

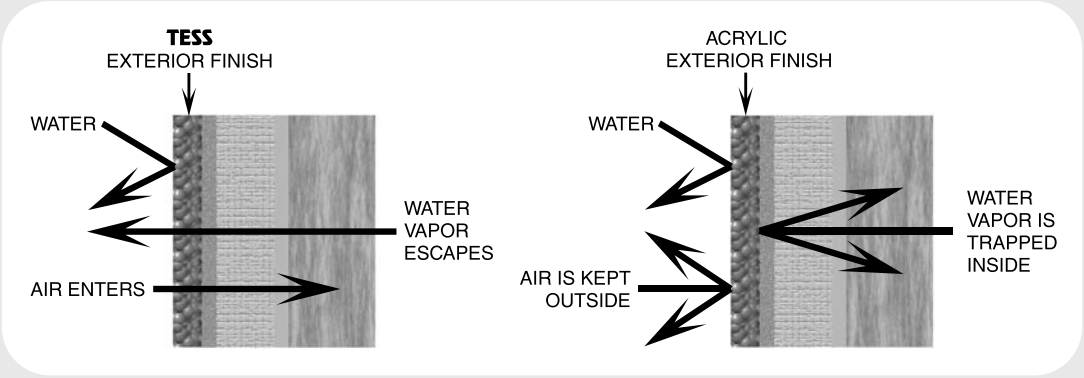
Weather barriers and water drainage membranes protect substrates and framing from moisture intrusion. There are many kinds of weather barriers and they are produced by a variety of companies. Formulated Solutions LLC recommends Tyvek® Stucco Wrap manufactured by DuPont, to protect the underlying substrate from water damage. Tyvek® is a sheet of fabric manufactured to resist moisture. Tyvek must be installed in accordance with DuPont's "Tyvek Water-Resistive Barriers Installation Guidelines" and "Tyvek Weather Barrier Commercial Installation Guidelines." Applicators require training and certification.

Weather barriers are, by necessity, breathable materials, allowing water vapor to pass through them. This breathability is important to the long term durability of the structure. Moisture that is inhibited from moving between the inside and the outside of the structure will end up trapped inside the wall and result in a variety of damage, including wood rot, mold growth, termite infestation, and condensation on interior walls. For this reason, plastic sheeting, which is not vapor permeable, is not suitable as a weather barrier. Use only materials which are vapor permeable and intended for use as a weather barrier.

When installing TESS One Coat Stucco over concrete block, poured-in-place concrete or tilt-up concrete, walls generally do not require a weather barrier. Refer to local codes for specific requirements and guidelines.

Consider breathability. If breathability is crucial to the continued health and durability of a wall system—and we know that it is—then a wall system can perform no better than its weakest component. If the weather barrier and base coat breathe but the top or finish coat does not, then the performance of the whole system breaks down. Acrylic "stucco" finishes perform like a waterproof paint which inhibits the flow of air and moisture, thus trapping condensation inside the wall.

Unlike acrylic stuccos, which form a plastic (saran wrap-like) envelope around a building, TESS Finish is manufactured from natural, earthen components that yield vapor permeability identical to that of the weather barrier components of the wall. Moisture (water vapor) is free to travel through the wall in both directions, in a natural manner. TESS Finish is the first product that applies like EIFS while retaining the superior performance properties of a naturally breathing stucco.



Lath

One coat stucco installations over sheathing require the fitting of metal lath. Metal lath provides a mechanical grip for the stucco to hang on to and will support the weight of the stucco and the finish to come.

There are different types of metal lath. The most common types are expanded metal lath (also called diamond lath), woven wire lath (sometimes called stucco netting) and welded wire lath. Plastic lath is also available; though not as common as metal lath, its advantages are lightness and corrosion resistance. Lath also comes in several configurations and weights. Typical types are paper backed, self-furring, and galvanized. Always use galvanized lath on exterior walls to prevent corrosion from moisture. A good choice for common installations is 20 gauge galvanized lath with 1" diamond patterns complying with AC 191 and fastened to studs using # 8

screws, 3/8 diameter pan head at 7" OC to all studs and tracks.

Paper backed lath has building paper attached to the back of the lath to speed installation. Like any fabric or membrane paper, it is important that the paper be lapped properly when the lath is installed.

Self-furring lath has dimples or a wave pattern in it. With the protrusions facing the wall, the self-furring lath stands away from the wall slightly, ensuring that the stucco will be able to gain full, penetrating contact and achieve a strong mechanical attachment to the lath. When self-furring lath is not used, install furring strips behind the lath so that the lath stands slightly away from the wall. The furring strips serve the same purpose as the dimples or waves in the self-furring lath.

Care should be taken to install all laths in the proper direction. Expanded metal lath has a front and a back as well as a top and a bottom. When installed correctly, each diamond shaped opening forms a scoop for the stucco to sit in, thus ensuring full packing and superb connection.

For further information, review the following ASTM Specifications:

ASTM C-1063 Specification for details on the correct installation of lath and furring for use with stucco

ASTM 641/A641M Specification for Galvanized Wire

ASTM C847 Specification for Metal Lath

ASTM C933-96a Specification for Welded Wire Lath

ASTM C1032 Specification for Woven Wire Plaster Base

ASTM C1063 Specification for Installation of Lathing & Furring

Additional Considerations

A variety of methods and materials should be considered to make one coat stucco applications easier, more secure, thereby ensuring durable and attractive finished walls. Among these, the most common accompaniments are control joints, expansion joints, weep screeds, casing beads and corner aids.

It is well know that buildings and materials move naturally in response to temperature and humidity changes, wind loads, settlement, stress, structural loading, etc. The stucco itself will move in response to these same dynamics. In order to prevent these movements from damaging the finished surface, control joints or expansion joints are needed to absorb them.

Control joints are one-piece units that flex in response to movement. Expansion joints are two-piece assemblies that move against each other when other materials shift. Both are put in place using specialized plastic or metal trimmings. They can vary in depth according to the desired thickness of the stucco.

Control joint criteria are decided by the architect/designer of the project and local code. In absence of design parameter, control joints should be placed in every panel over 144 square feet and at a panel length to width ratio of 2.5:1.

Weep screeds are design elements that allow moisture that may collect behind the stucco to escape. Weep screeds are seen as small holes at window heads, at the tops of doors and other openings, and at the bottom of the wall. The weather barrier is lapped into the weep screed and, when properly installed, moisture can escape over the weather barrier and through the holes in the weep screed. Never apply finish into these joints and holes.

Casing beads, also known as "J Channels," are used when stucco abuts windows, doors and soffits. They provide a clean termination for the stucco and provide a space or joint, for caulking. Wherever stucco meets another building component, i.e. door/window, frame, roof, pipes, meter boxes, exterior spigots, etc. a minimum ½" wide sealant must be provided. Corner aids regulate stucco thickness at corners. They also reduce the likelihood of cracking by giving support to a thick layer of stucco that is more stress resistant than a thin layer. These accessories also provide the applicator with "screeds," or high points that contractors can plumb to in order to ensure that the stucco thickness is uniform across the wall.

Always follow the architectural specifications, manufacturer's guidelines and applicable codes when installing accessories. TESS One Coat Stucco should always be in direct contact with these types of accessories.

If stucco bonds to wood or to metal other than the lath or specialized accessories, for example to electrical conduit, plumbing outlets or other penetrating hardware, stresses may cause a fracture. To prevent this, applicators should install building paper over wood or metal penetrations that pierce the weather barrier and lath.

Stucco Bases

TESS One Coat Stucco

TESS One Coat Stucco is the most efficient and economical method of finishing walls. As its name implies, One Coat Stucco is applied as a single coat, rather than as two or three coats. TESS Finish is then applied over this stucco base.

TESS One Coat Stucco is a pre-blended proprietary product that includes fiber-reinforcement and other performance enhancing ingredients that improve its strength and help it to resist cracking. It is available either in a concentrated form, requiring the addition of sand and water on the jobsite, or in a pre-sanded version requiring only the addition of water. One Coat Stucco applies faster, easier and is more flexible than traditional three coat stuccos. While not as thick as a three coat system, it is much lighter while providing equivalent strength and durability. The disadvantages of field mixed stuccos are numerous and are principally dependant upon the skill and experience level of the contractor's workforce. Problems such as improper proportioning and mixing of materials, improper aggregate selection, lack of quality control and deficient curing often result in weak, cracking walls.

Three coat stucco is applied, as the name suggests, in three coats. The stucco base itself is applied in two coats and these are followed by a third finish coat. Each of the

two stucco base coats is typically applied 3/8" thick, resulting in a finished stucco base of 3/4". Final thickness depends upon the depth of the control joints and the accessories chosen. The first coat of the three-coat stucco base is called the "scratch" coat. This coat locks into the lath, covering it completely. As this first layer begins curing, the applicator will scarify it by cutting long horizontal grooves into it with a metal comb. These grooves, which give the scratch coat its name, provide a rough mechanical surface for the next layer of stucco to key to thereby forming a solid mechanical bond.

The second coat of the three-coat system is termed the "brown" coat. The brown coat is troweled into the grooves of the scratch coat and is built-up to 3/8" thick. This brings the two layers of stucco to a total of 3/4" thick. The brown coat layer is often smoothed with a darby, a long metal tool that runs along the top of the lath accessories and plumbs the stucco across the wall. Lastly, the completed scratch and brown coats are left to cure fully before finishing.

One Coat Stucco is prepared in the same manner as a three coat application. However, extra care should be used in preparing the wall because the size of the accessories will be different to compensate for the thinner application of the one coat. The one coat stucco's thinner application means there is less room for error since mistakes are more difficult to conceal in the thinner layer. TESS One Coat Stucco is applied in a single layer 3/8" to 5/8" thick, fully covering the lath. It can also be applied in two coats like a scratch and brown for a combined thickness 5/8". Substrate imperfections such as high spots will be easier to conceal with this heavier application. Furthermore, the thin places in the stucco that these high spots can cause will be more crack resistant with a thicker application of material.

After application, the stucco is smoothed and allowed to cure. As with three coat stucco, proper curing is essential. Because One Coat Stucco is Portland cement-based, it must be fully hydrated to gain its full strength.

For further information, review ASTM C926-98a Specification for Application of Portland Cement-based Plaster.

Jobsite Additions for TESS One Coat Stucco

Foreign materials added at a job site can detrimentally affect TESS One Coat Stucco performance. Materials added on site include primarily sand, water and possibly acrylic additive. Sand is added to pre-blended, one coat (unsanded) stucco concentrate. The size, quality and cleanliness of the sand are of utmost importance. Sand, added in accordance with package instructions, adds strength and workability to the stucco. But, too much sand can result in a weak wall. Inversely, too little sand can result in an abundance of shrinkage cracks. Sand must also be of the correct size to be effective. Sand that is too small or too large will have a negative impact on the workability and durability of the wall. Additionally, sand that is dirty or contaminated with clays, salts or other foreign matter will weaken the stucco. Be sure to follow package instructions. Using the pre-sanded formulation eliminates the concern over proportions and quality of sand. The water used in

stucco can also impact its performance. Water should be clean, cool and potable. Do not add fibers to TESS One Coat Stucco; it already contains fiber to reduce the likelihood of cracking and to strengthen the stucco matrix. Acrylic additives are polymer admixtures designated to improve the flexibility and workability of the stucco. They also improve bonding characteristics and aid in reducing cracks by improving the hydration of the stucco. Follow manufacturers' recommendations for the amount of additive to use. Most additives have a minimum threshold for effectiveness. Unless you add the minimum quantity recommended by the manufacturer it will have no impact on the strength or workability of the stucco. Be sure to add the correct amount to ensure optimum performance. Never add materials not specified by Formulated Solutions LLC to TESS One Coat Stucco. Unqualified additions void all warranties.

For further information, review ASTM C778-00 Specification for standard sand.

Curing One Coat Stucco

Curing is an important step in ensuring the quality of the finished product. Proper curing of the One Coat Stucco will improve its strength and reduce the potential for cracking.

Portland cement is the primary ingredient in stucco. When mixed with water it begins to harden, or cure, in a chemical reaction known as hydration. The cement molecules form bonds to each other and to the other materials in the mix. The more hydrated the cement, the more bonds will form and consequently, the stronger the stucco will be. Hydration continues over the life of the wall, but moisture is needed in order for hydration to continue and these bonds to continue forming. Should the stucco dry out, the bonds needed to provide strength will not form and the result is weak stucco that cracks or crumbles. The water that is used to mix the stucco provides the moisture needed to form the initial chemical bonds and harden the cement. However, some of this water is lost to evaporation and absorption by other materials. On a hot, dry day, stucco can dry rapidly without forming the necessary bonds. When stucco is applied over concrete block or poured concrete, the dry, absorbing substrate may suck up some of the water from the stucco. To prevent the stucco from losing the water it needs to fully hydrate, damp curing is recommended. Damp curing involves lightly misting the stucco with water to replenish the moisture lost through the sources previously mentioned. Misting should begin as soon as the stucco can be wetted without eroding and should continue at intervals for at least 48 hours, but preferably 72 hours. On a hot, dry day, to properly cure, a stucco wall should feel cool to the touch. Stucco will gain roughly 75% of its strength at the end of seven days. Most of the remaining curing occurs up to 28 days from its initial placement, and actually continues after that into the indefinite future, so the wall is always getting stronger with time.

TESS Finish and One Coat Stucco

Finish provides the final look of the wall adding color and texture. A variety of options are available, allowing architects, builders and owners to express their individual preference.

One Coat Stucco provides a strong, durable, climate-resistant cladding for buildings. It is designed to keep the elements out and protect the interior from the environment outside. Finishes are the visual, decorative element of the wall, providing color, texture and aesthetic appeal. But finish takes account of important performance characteristics as well, including resistance to fading, chipping and cracking.

The stucco and EIFS industries offer a variety of finish choices. A brief listing of common finish types and a description of TESS Finish ensues.

The three most popular products for decorating stucco are paint, textured cementitious finish and textured acrylic finish.

In the stucco industry, "coatings" refer to paints or other materials that add only color and are generally applied to the stucco base by spraying or by roller. Whereas claddings that add texture as well as color and are spray or trowel applied are called "finishes."

The term "primers" describes coatings used to prepare the stucco base for the final finish coat. TESS Primer is used in conjunction with TESS Finish.

Primers

TESS Primer is a thin coating used under TESS Finish to ensure maximum job performance and avoid a variety of potential installation problems. TESS Primer should be considered an economical insurance policy offering tremendous value by securing the job at minimal expense. When specifying a project, architects and designers should consider the long-term value of primer in terms of the problems and nuisances they can eliminate. Primer imparts four crucially significant additions to an installation:

- Improves the bond between the finish coat and the stucco base. This eliminates potential adhesion troubles such as peeling, which can derive from surface contamination or insufficiently cured stucco base.
- Promotes a more even color in the final finish coat. Color can vary due to inconsistent gauge of the applied finish coat. By using the same color primer as the finish coat, color bleed-through is eliminated. This is especially true when light colored finishes are used over the typically gray-colored stucco base.
- Improves the coverage of the final finish coat by allowing the finish to be floated "tighter" without becoming too thin or transparent. In this way, primers provide an economical solution by cutting back on more expensive finish coat.

- Improves the uniformity and homogeneity of the stucco base by closing pores, imperfections and hairline cracks, thereby providing a smooth, unvarying surface for final finish application. This further speeds installation by providing the most near-to-perfect application surface.

TESS Primer eliminates future callbacks.

The TESS One Coat Stucco Advantage

"One-coat stuccos" are typically composed of a cementitious stucco layer — 1/2" to 3/4" thick — coated with an *acrylic primer* and topped with a textured *acrylic finish*. Typical acrylic primers exhibit a perm rate of about 8 when applied at the standard rate of 250 square feet per gallon. If we use 58 perms — the vapor permeability rate of Tyvek® HomeWrap® — as a relevant point of reference, it is clear that acrylic primers serve to retard overall permeability, thus trapping water vapor inside the wall system. This undesirable effect is made worse by the addition of a textured acrylic finish which reduces overall vapor permeability even more.

When water becomes trapped inside a wall system, it diminishes the integrity and durability of that wall system by providing an ideal environment for the growth of molds and other pathogens.

By contrast, TESS One Coat Stucco utilizes a *flexbile cementitious primer* coating with a perm rate of 70, yielding a substantially more "breathable" surface by design. As the final coat, TESS Finish also exhibits a perm rating of 70, further facilitating passage of water vapor from inside to outside the wall system, thus eliminating water entrapment. That is *The TESS Advantage*.

Additionally, with its high perm rating of 70, TESS One Coat Stucco is already advanced well beyond any anticipated improvements to other components in a complete exterior wall system.

Usage

TESS One Coat Stucco

The One Coat Stucco is mixed as per package instructions and applied approximately ½ inch in thickness over the substrate. Provide appropriate control joints as called for by local code and/or architect's specifications.

TESS Primer

Apply TESS Primer over the One Coat Stucco after it has dried completely. Each bag of 20 pounds mixed with 1½ gallons of water will yield 3½ gallons of primer. TESS Primer is mixed as specified on the package instructions and applied at a coverage rate of 490 sq. ft. per bag. The mixed primer is roller applied.

TESS Finish Application

Once the TESS Primer has dried the surface is ready for the finish application. Plan the application so that given sections of wall can be completed at one time without interruption. Mix TESS Finish carefully as per package instructions. Do not add water beyond the range specified. Add the same amount of water to each bag of finish throughout the entire job. Apply the finish with a stainless steel trowel and float with a plastic one. Work in pairs, with the first person applying the finish to the wall and the second person floating the finish to the desired texture. Do not wet the plastic float during the finishing operation. Avoid installing separate batches of finish side-by-side. Interrupt the application ONLY at natural breaks in the construction such as expansion joints, change of plane, system terminations, etc. Ensure that all expansion/control joints are followed as per code or architect specifications. Important: Do not apply TESS Finish if rain is expected within 24 hours. Check local weather forecast or www.weather.com. Protect new work from downpours. Always be prepared to cover new work with plastic sheeting or tarps immediately after placement for a minimum of 24 hours. Failure to do so can result in permanently stained finish.

Preventing Problems

It is impossible to over-emphasize the importance of prudent workmanship and proper installation of substrates, weather barriers and lath to stucco installations. Ensuring that these elements are properly managed will reduce job complaints and will eliminate potential sources of repair expense. The details below highlight typical problems that sometimes occur during installation.

Cracking

Cracking is typically the result of unrestrained building movement, uncontrolled stucco movement or is a negative consequence of the stucco curing process. When dealing with cracks identify the type of crack and secondly, attempt to isolate its source. Cracks under windows may be caused by improper window installation or failure to employ control joints. Cracks that appear in other façade materials, as well as in the stucco itself, may be due to settling or other slab movement.

Vertical cracks that appear every 16" or 24" indicate possible stud movement. Vertical and horizontal cracks at regular intervals, especially every 48" or 96" may also be substrate-related. They may also result from improper lapping of lath or from improperly fastened lath. Cracks around penetrations such as electrical outlets, hose bibs or pipes may be caused by stucco bonding to the penetrating hardware.

Improper stucco mixing may result in "veining" or random cracking within the stucco. Too little sand, the wrong type of sand, or too much water in the mix can all cause this. Improper curing or mixing may cause a "sandy" or powdery stucco surface. Remember that stucco walls should be wet-cured for 48 hours. This is especially important in hot and arid climates where stucco can quickly dry out and

fail to fully cure as a result. Consider using TESS Additive and Bonding Agent to avoid this problem. A sandy surface can also be caused by adding too much sand to the mix, or by using the wrong size sand in unsanded, one coat stucco concentrate.

Efflorescence

Efflorescence is a whitish, chalky substance that sometimes appears on cement substrates such as stucco, as they cure and especially if they are rewet during the initial drying stage. Efflorescence is a deposit of salts carried by water through the stucco to the surface. Though basically an aesthetic issue, efflorescence may inhibit bonding of the finish coat and must be removed before they are applied. To remove efflorescence, clean with a dilute solution of muriatic acid or a commercial efflorescence remover using a stiff bristle brush.

Peeling Finish

Stucco base must be clean and cured before finish can be applied, otherwise a strong bond will not form between the two. Be sure that the stucco is free of moisture, dust, efflorescence and other contamination and that it has cured sufficiently before applying finish. The vapor permeability of TESS Finish allows excess moisture in the stucco to escape thereby avoiding the problem common to acrylic finishes wherein moisture trapped behind the finish appears as bubbles in the finish surface and impairs the adhesion of the finish.

Color Fading

Pigments used in building finishes and coatings will fade over time due to UV (ultraviolet) degradation. Dark colors are especially prone to fading, particularly blue colors. When possible avoid using dark colors that are exposed to constant or intense sunlight.

Thin Finish

If the stucco base's color is visible through the finish coat, or the finish appears thin in spots, the finish may have been applied too lightly. Be sure to check coverage to ensure that finish is applied evenly and neither too heavy or too thin. The use of primer will eliminate this potential problem.

TESS Products

The next generation in architectural finishes, TESS Finish brings unparalleled performance to every job. Formulated Solutions is the originator and only manufacturer of TESS Finish. Formulated Solutions manufactures the complete range of TESS stucco and finish products mentioned in this guide.

TESS Additive and Bonding Agent (TABA)

TABA is an acrylic additive that offers several advantages when added to TESS One Coat Stucco. TABA increases the adhesive, flexural and tensile strength of the stucco, making it bond better to questionable surfaces and simultaneously making it more resistant to cracking. TABA improves the curing of the stucco as well, helping to essentially damp cure it *in situ* by retaining moisture during the cure cycle, resulting in greater hydration and fuller cure. TABA also improves the workability of stucco, making it trowel softer, creamier and smoother. Applicators benefit from these improved handling characteristics.

TESS One Coat Stucco

TESS One Coat is Formulated Solutions' response to the need for convenient, speedy and economical stucco jobs. It has been designed to make stucco applications faster, simpler, easier and most importantly, fool proof. TESS One Coat is fiber-reinforced stucco that is applied 3/8" to 5/8" thick in a single pass. Fiber-reinforcement makes TESS One Coat Stucco more resistant to cracking than field mixes. It also provides greater flexural strength than field mixes and works easily. TESS One Coat Stucco offers the advantages of a factory-blended product, including reliable quality control and consistent proportioning. The value of factory controlled blending and unswerving quality cannot be understated in today's construction environment.

TESS Primer

TESS Primer provides a number of important functions. It increases the bond strength between the finish coat and the stucco base. It imparts a more uniform surface for the finish application thereby ensuring consistent, uniform coverage and color. It provides a secure base for the finish to bond to, and lastly, TESS Primer increases finish coverage significantly thereby providing a savings benefit against the more costly finish coat.

TESS Finish

An integrally-colored textured wall finish available in four textures and 48 popular colors, as well as custom colors. TESS Finish provides a versatile, decorative and protective cladding improved by advanced polymer technology, silicone-enhanced to provide a finish with superior levels of water resistance, durability, and impressive resistance to dirt pick-up. Its exceptional water vapor permeability exceeds the highest levels of competitor's top-line finish performance. Lastly,

advanced anti-microbial protection provides the maximum in mildew/algae growth yielding the lowest maintenance and longest service life of any cladding in the marketplace.

Formulated Solutions LLC is Here to Serve You

Formulated Solutions (FS) maintains a centralized, automated color lab. Custom colors are developed and furnished promptly along with fast sample production. Nearly unlimited color formulas are available at the point of sale through Distributor tinting.

To better serve the industry with technical assistance in design and application, FS has technicians experienced and trained in all aspects of FS products and systems. These technicians are available to assist you.

Contact your local FS Distributor or call 1 718 267 6380. Our website at www.TessFinishes.com proffers an easy to use reference source for the building professional to view, download and print, including:

- Company Information
- Application Guides
- Detail Drawings
- Building Code Approvals
- LEED Statement
- Product Bulletins
- Technical Data Sheets (TDS)
- Material Safety Data Sheets (MSDS)
- Color Selection Charts
- Completed Jobs File
- Warranty Information

NOTICE and WARRANTY DISCLAIMER

Formulated Solutions (FS) products are intended for use by qualified professional contractors, not D-I-Y consumers or handymen. TESS systems and components must be specified by a qualified design professional, general contractor or builder as an element of a larger construction project. It must be installed in accordance with FS's instructions, the designer's specifications and local building code. Improper use of FS products or use as part of an improperly designed or constructed larger assembly or building may result in serious damage to this product, and to the structure of the building or its components.

FS disclaims all, and assumes no, liability for

- Products improperly applied by unqualified persons or entities
- An improperly designed or constructed building
- The nonperformance of adjacent building components or assemblies
- Other construction activities beyond FS's control
- On-site inspections

FS has provided the enclosed Instructions and Recommendations [I/R] to assist the USER in the application of this product. These I/Rs are not warranted to be comprehensive, complete, thorough or conclusive as regards any specific installation. It is the USER'S obligation to ensure that the product is suitable for its intended use and that it is compatible with existing conditions or applications of other coincident or adjoining materials. The liability of the SELLER and MANUFACTURER, whether express or implied, whether in contract or in tort, arising out of warranties, representations, instructions or defects from any cause shall be limited exclusively to replacing the product, provided the same is proved defective, or refunding the purchase price upon return of the unused product. In no event will SELLER or MANUFACTURER be liable for consequential damages, including but not limited to loss of materials, costs of labor, loss of profits, costs of replacement goods, or other commercial loss. The USER accepts the product AS IS, and without warranties express or implied.

Subject to FS approval, certain installations of TESS Finish may be eligible for a limited warranty provided by FS. For further information, please contact your Distributor.

For the most current and complete information on proper application, clean-up, mixing, specifications, warranties, cautions and disclaimers, please refer to the company manual or our website at www.TESSFinishes.com.

Formulated Solutions LLC
25-44 Borough Place, Woodside, NY 11377
T 718 267 6380 • F 718 204 6013

