Lime Plaster Application Guide

THIS GUIDE PROVIDES IN-DEPTH INSTRUCTION for applying Limestrong Build™ (LSB) for a basic three-coat plaster rendering. Instructions specific to preparing and applying LSB Binder on various substrates—straw, hemp, adobe, cinder block, EPS, and so on—are available in separate publications (listed below, right) and should be consulted for the necessary specifics of preparing the substrate for lime plaster.

BASE CONCEPTS

The following are foundational concepts to understand when working with lime plasters, as lime plaster behaves and is handled differently from common Portland cement-based stucco plasters in these key areas:

MIXING. With pozzolanic lime plasters like Limestrong Build Binder and Finish, you don’t have the high-charging set found in Portland cement formulations. Mix the mud longer than is typical with Portland cement stuccos, as longer mixing times “fatten,” or enhance the workability of the lime plaster and allow a more thorough hydration of the lime. Mix a batch of lime plaster at least five minutes, let it sit for three to five minutes to slake, then remix for two minutes (or more)[XIX].

HOLDING AND RETEMPERING. Lime plaster can be re-tempered (returned to a workable fluidity if too stiff) as needed to keep it workable, as there are no fast-setting bonds being broken when remixing (which weakens the final, overall plaster set of Portland cement plasters). LSB plasters can be covered tightly and stored (keep cool) for 3 to 5 days, then retempered for use.

DAMPEN WALLS FIRST AND BETWEEN COATS. First Coat: depending on the material being plastered over, the substrate may need to be dampened (but not saturated) before the scratch coat is applied. Refer to the publications for applying LSB Build to specific substrate types (listed right).

After a functional cure has been achieved on a previous coat, the plaster should be mist-dampened thoroughly with a tank sprayer, misting hose attachment, or a wide brush. Do not over-do it—continue to apply water if it is being absorbed; stop when it begins beading up—you don’t want water running down the wall.

The purpose of dampening is to reduce suction—between substrate and scratch coat, and between layers. Suction is a crucial part of the bonding process of lime plasters and some suction is important, but it must be controlled. The pre-wetting process also prevents the substrate or cured layer beneath from sucking too much moisture from the fresh plaster, which weakens the overall cured strength and performance and reduces working time.

CURE. Lime plasters cure more slowly than cement-based stuccos, necessitating more care to keep the plaster surface misted and moist as it dries, allowing it to properly cure from the outside in. Take into consideration the climate and current
weather conditions and forecasts and prepare accordingly. In adverse conditions, you many need scaffolding-hung wind
shielding or tarp shading to protect the curing plaster. At a minimum, be prepared with tank sprayers to mist the curing plaster.

KEY: It is this proper cure that provides lime plaster with its desirable and functional character: breathability, flexibility,
autogenous healing, strength and more. And that process takes time.

A pozzolanic lime plaster like Limestrong Build cures a bit more quickly than non-hydraulic air-curing limes. Allow 3–5 to 10
days (depending on climate/weather) for the initial, functional cure to happen before applying the next coat. Longer is better.
Plan the application schedule accordingly. Best practice dictates that plaster coats should be kept misted and moist during this
initial curing period.

AGGREGATE. As lime plasters rely more on the mechanical bonding of the aggregate (sand) particles for finished strength than
Portland cement plasters, the right sand needs to be used. Functional lime plaster sand has three key characteristics: Angular
(sharp) particles, a blend of particle-grade sizes, and free of contaminates. Please read the LSB publication: Sourcing Sand for
full details and illustrations. Note that Limestrong Build Binder is shipped as binder only; sand will need to be sourced locally.

PRE-APPLICATION PREP

Begin by gathering the tools, equipment, and help you’ll need to take a wall from first move through curing.[322]

SCAFFOLDING. Set up scaffolding so applicators can easily reach the entire wall. Never apply plaster from a ladder. Set
scaffolding back from the wall enough to allow easy reach from middle to inside-third of the scaffold planking. Get enough
scaffolding in place so an entire wall section (height and width) can be worked in one go.

MASK OFF AND PROTECT. Mask off and protect areas that will not be plastered. Even if you’re not planning on spray-application,
applying plaster is messy work. You MUST adequately and securely protect floors, wood trim, concrete, stone work, vents and
other openings from wet plaster. Wet lime will stain and even etch some surfaces. Considering the bustle of activity around a
plastering site, it is best to use a good stucco tape—especially if taping up plastic or paper sheeting.[322]

PRACTICE. If you’re new to applying plaster, build a couple of practice panels to learn on. The final finish look and texture
should also be practiced—there are many textural effects that can be achieved in the finish coat. Take the time to practice
achieving the look you want. Make sure it is something you can accomplish on a large scale.

WEATHER WINDOW. Choose a good application weather window. You’ve at least 3 days between coats; could be 5 to 10 in
humid climates and/or during colder shoulder seasons, so factor in the overall cure time for all three coats. If the weather forecast
looks sketchy during the 2 to 3 week exterior application period, plan ahead for adverse weather shielding, extra misting, and so
on as climate and weather conditions dictate.

Think through the approach. For example, on a hot day with intense direct sun, it makes sense to choose to begin work in the
morning shade on the west walls, then move to the north wall, then around to the east walls in the afternoon. That way you’re
avoiding the direct heat of the sun—good for both the applicators and the early stages of the plaster cure. Plan to provide the
curing care needed for coat-completed walls even as you’re working on the next wall. And so on.

SURFACE PREP. The surface must be properly prepared to accept lime plaster—cleaned and repaired as necessary.[323]
Securely mask soffits, vent openings, electrical boxes, wood sills and beams, floors and other surfaces (flagstone, pavers,
concrete). Know the pre-wetting/damping requirements necessary between the substrate and begin that process as instructed—depending on the substrate[1], that may begin a day or two before the plaster application.

If applying Limestrong Build over existing lime plaster on an older building, be sure to scrape out and fill cracks, remove loose
sections and particles and otherwise ensure the plaster substrate is sound.

Repairs requiring filling (dubbing out) with plaster—cracks, voids, repointed mortar joints—must be made days ahead of the
main application to allow for the repairs to cure.

FOOTNOTES [0]
[1] Refer to the appropriate substrate-specific guide.

CROSS REFERENCES [XRX]
[XR2] See LSB Publication: Plaster Tools and Equipment
[XR3] See LSB Publication: Troubleshooting—Voids, Cracks and Other Substrate Damage
In cases where the new plaster is rendered over existing lime plaster, the scratch coat can be skipped if proper repairs and fills and leveling work has been done. Paint, wall paper glue, dirt and other low-bond surfactants MUST be completely removed. Provide some kind of tooth (mechanical key) by roughening/scratching/gouging the surface. Then be sure to properly dampen the surface prior to application.

**STRUCTURAL CHECK.** Check that the surface preparations and structural build-out are correct and adequate. No part of the finished plaster surface should come in contact with the soil—pay attention to places where soil may be introduced later as part of the landscaping build and ensure the soil bed levels are well below the bottom edge of the plaster. Inspect the build of structure’s eaves and other roof overhangs to ensure running water is not going to contact the plaster directly. See that the final landscaping properly slopes away from the building and, in areas of heavy rainfall, that adequate drainage is provided. Where rain gutters are used, see to it that the downspouts and drains are properly designed and installed to carry the water away from the plastered wall instead of letting it splash back. Check that OSB or plywood sheeting, if used behind the lath, has been edge-gapped to accommodate swelling and the WRB is in good repair. Ensure lath has been securely fastened.

**MIX TRAINING.** Train the mixer operator to deliver consistently hydrated and time-mixed mud batch to batch. Mix a test batch to work out all the particulars—then note quantities of binder, sand, and water used. Memorize the “look” of the mud when properly proportioned and mixed. Determine best material quantities for most efficient batch mixing in the particular mixer being used[3].

Use the right mix ratios for the particular substrate and the particular coat, per the volume ratios table published in the LSB Publication: Mixing Limestrong Build.

**DAMPEN.** Clean and dampen (if applicable) the wall/substrate surface before application of scratch coat[2].

**STORAGE AND USE WINDOW**

Once mixed, Limestrong Build plasters can remain usable for 3 to 5 days IF stored tightly covered and kept cool (but not allowed to freeze). A pozzolanic hydraulic lime (PHL) plaster—being slightly hydraulic—is strongly affected by temperature. If stored in warm-to-hot conditions, the mixed plaster mud will set faster than if stored in cool, above-freezing temperatures. Within the 3-to-5 day window, retempering[3] may be necessary to return the mud to an ideal working consistency.

**THE APPLICATION PROCESS: BINDER (SCRATCH AND LEVELING COATS)**

**METHOD: SPRAY APPLICATION.** Spraying on lime plaster using a texture or stucco sprayer[8] is both efficient (faster application) and advantageous to a good bond—substrate-to-plaster or plaster-to-plaster. Mask areas that don’t get plaster.

How stiff to mix the mud for spray application is dictated by what works best through the sprayer rig. A fairly stiff (well mixed and fat) mud provides the best end result. In other words, batch the mud just soft and fluid enough to run through the sprayer rig. Too stiff and it bridges up in the hopper and won’t readily flow down into the airstream for ejection though the ports. Too wet and it sags on the wall, is hard to trowel-tighten to a consistent coat height, extends curing time, and exacerbates shrinkage cracking.

The spray application should be followed by troweling to press-contact the plaster more completely to the substrate, tighten and consolidate the plaster, and to even out the thickness of the coat over the wall section. Avoid overworking, or slicking, the plaster surface.

**METHOD: HAWK AND TROWEL APPLICATION.** Move mud from the mud board (or bucket) to the hawk with a scoop or a kite-shaped mason’s trowel. The hawk is easiest to use and balance when the mud is loaded, carried, and balanced in the center of the hawk. Tip the hawk into the trowel and skim the mud with the trowel to load the trowel, then transfer the mud on the trowel immediately to the wall.

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**FOOTNOTES**

[0] See LSB Publication: Mixing Limestrong Build

KEY: When applying plaster, the loaded trowel is always moved in an upward stroke. The next loaded stroke starts lower (overlapping the tail of the previous) and moves up. By working in repeated, overlapping up-strokes, the mud stays on the trowel until pushed onto the wall. As you complete each stroke, move the trowel in a sweeping circular motion to one side, which helps break the suction between the trowel and the mud so you do not pull the mud back off the wall.

Work with a wet edge, blending one section of work into the next. Complete an entire wall or wall section before moving on. Avoid overworking and slicking the surface, as it creates a poor bonding surface for the next coat and pulls too many sand and lime fines to the surface.

THREE-COAT PLASTER. Lime plasters are typically applied in three coats, or layers. Why three coats, instead of one thick one? Cured strength. The beauty, function and enduring strength of a pozzolanic lime plaster rendering is realized through proper curing. Two primary coats—the scratch and leveling (brown) coats—followed by a final, thin, finishing coat, each allowed to properly cure—is the best way to achieve a high-performance lime plaster wall finish.

ONE. The SCRATCH COAT is the layer that goes on over the building substrate and serves to anchor the entire plaster surface to the wall structure. KEYS to a successful scratch coat:

1) the preparation of the substrate has to be right;
2) the richness of the scratch coat mix needs to be right;
3) the scratch coat surface should finished with tooth (scored/scratched);
4) the curing process needs to be thorough and well-tended;
5) the cured surface needs to be cleaned (loose grains needs to be brushed off) and dampened before the leveling (brown) coat is applied.

Apply the scratch coat with either a hawk and towel or by spray-application. If spray applying, follow up with a plaster trowel to compress and level-up the mud. Don’t work the mud too long with the trowel—the objective of the scratch coat is to get the mud evenly pressed into the substrate—the straw, the lath, the block—to provide a firmly attached base for the subsequent coats.

The thickness of this coat depends on the substrate to which it is being applied (see substrate-specific guidelines), but typically you want one-quarter (1/4) to three-eights (3/8) of-an-inch at the most in thickness. Avoid going over recommended thickness for the substrate, as this makes the cure time more lengthy and difficult and puts more weight on the wall than is necessary.

Scratch or key the still-wet scratch coat using a scratching/scarifying tool. This provides tooth—a roughened or keyed surface that enhances the mechanical bond between first and second coats. Take care not to cut too deeply—a quarter (1/4) inch at the most. Scratch in a horizontal pattern for optimal hold.

Allow the scratch coat to cure at least 3 days. Longer is better—7 to 10 days is ideal, depending on atmospheric conditions. Take care to keep the surface damp as it cures by gently misting it with a tank sprayer as local heat, humidity, exposure and wind conditions demand. (See CURING, page 7).

TWO. The LEVELING COAT (brown/float/straightening coat) is applied over the functionally-cured scratch coat. First, brush over the scratch coat to remove loose grains...there will likely be quite a few, especially as the result of the keying process with the scratching tool. You may need to use a trowel to gently knock off some of the plaster crumbs. Then thoroughly dampen the scratch coat, either with tank sprayer or with a broad brush. Dampen a working section of wall at a time. As you work, you’ll get an idea of how fast you’re applying the second coat and how big of a wall section you need to dampen. Dampen to rejection—meaning mist as long as the scratch coat is absorbing water; quit applying when water beads up and wants to run.

The water from the dampening process helps create mechanical suction between the two layers, working in conjunction with the keyed surface to hold the heavy wet mud where you put it. Dampening the surface of the cured layer also alleviates the tendency of a dry(er) surface to pull water from the wet surface, unbalancing the cure of the newly-applied coat.

FOOTNOTES [0]
[4] See the appropriate LSB Substrate-Specific Application Guide publication for how rich to mix the scratch coat for various substrates.

CROSS REFERENCES [XR]
[XR6] See LSB Publication: Plaster Tools and Equipment—Figure 06
[XR7] See LSB Publication: Plaster Tools and Equipment—Figure 07
This second coat is where you make every effort to **level the plaster**, bringing up the low spots and knocking down the high, striving for a pleasing, uniform look to the wall. **KEY:** Know that with the leveling coat, what you see when done is what you’ll get in shape and form for the finished appearance—the final finish coat provides no opportunity to fill, fix, or level, as it is just a thin decorative skim on the leveling coat. Some substrates, of course, like strawbale, defy any such uniformity, and that’s not what you want anyway, as the subtle rise and fall of a strawbale-plastered surface is inherent to the beauty of the wall.

The leveling coat can be applied either with a hawk and trowel or spray-applied and trowel finished. **As for thickness**, you’re looking at three-eighths (3/8) to one-half (1/2) of an inch; no more than 1/2-inch. If additional thickness is needed in some areas to get things straightened up and looking good, apply the additional plaster as another layer in those places, (allowing the previous leveling layer to cure for 3 to 5 days before adding the subsequent leveling layer).

Take care not to tightly burnish or “slick” the surface as you work the plaster, as you’ll need some mechanical tool to hold the final thin finish coat. You will not scratch-tool or scarify this coat, but it needs to have a somewhat toothy, sandy surface.

The best way to **add tooth** is to float the damp, drying surface with a sponge or a wood float, working in a circular motion to create a roughened, sandy, uniform surface to hold the finish coat. This step is time-critical—it needs to be done when the plaster is dry enough that your floating doesn’t deform the layer, but not so dry that the surface won’t respond to the dampened float.

Allow for at least a functional cure of the leveling coat—3 days minimum, 7 to 10 days is ideal—before applying the finish coat.

**THE APPLICATION PROCESS: FINISH (FINAL COAT)**

**THREE**. The **finish coat** is applied thinner than the previous coats. Surface imperfections and leveling should be handled with the second, or leveling coat. The purpose of the finish coat is to place the color and/or finish texture that is desired—whether that is a light-dissipating, imperfection-hiding rustically-roughened surface, or a smoother, tightly worked, lightly textured surface.

**No Third Finish Coat.** As an alternative to a finish coat, the first two coats can be applied slightly thicker (to achieve the desired overall strength and texture), and the surface of the leveling coat worked to the desired finish texture. In such cases, color pigments are added to the leveling coat during mixing (requires more pigment) or color is applied as two-or-more applications of lime wash mineral paint/stain after the leveling coat is fully cured.

**Using Binder for the Finish Coat.** Limestrong Build makes a line of ready-to-mix finish plaster products—LSB Coarse Finish, LSB Fine Finish, and LSB Interior Finish—designed to provide consistency and bucket-batch convenience, but LSB Binder can also be used for the finish coat. The key is to use a finer gradation of sand/aggregate if a smooth-to-lightly textured, tool-finished surface is desired. Because the finish coat is applied thin, the top-end sizes in the sand stockpile will have to be screened off or a finer-grained plaster sand blend has to be sourced. Note that damp sand is difficult to screen...it will need to be spread and sun-dried first.

As a rule of thumb, the largest sand grain size should be no more than half the height of the finish coat, allowing the applicator to push the large grains to the back and bring finer grains to the surface. If a grain-gouged finish texture is wanted (wherein the large grains are at the same thickness as the coat and roll around under the trowel, cutting paths through the finish), then the finer gradation of sand is not needed. Work the finish texture out on practice panels.

**COLOR,** if desired, is added to the finish coat mix (or applied as a limewash). The method for how the colorant is mixed into the mud depends on whether it is a liquid or powdered pigment. Reference the LSB publication: **Mixing Limestrong Plaster** for instruction on coloring lime plaster. The **Limestrong Color System** is designed to work efficiently with Limestrong Build Finish plasters, making it easier to attain consistent color across the entire wall.

**APPLYING LIMESTRONG BUILD FINISH PLASTERS**

**PREP THE SURFACE.** Limestrong Build Finish plasters can be applied directly to some absorbent, flat, even substrates, provided the surface has a bit of a textured roughness for grip. For substrates that lack the necessary texture or absorbency, Limestrong Fortifier[^3] can be added during mixing to improve the bond-grip between plaster and substrate.

Keep in mind that finish plasters are applied thin (max thickness of 1/8-inch for LSB Fine Finish and 1/4-inch max thickness for LSB Coarse Finish) and surface imperfections from the substrate—joints, voids, offsets—that have not been properly prepped, filled, and leveled, will telegraph through the finish coat. The surface must also be clean and free of dust.
Suitable Substrates for LSB COARSE FINISH and LSB FINE FINISH include cement backer board (properly prepared) and direct application on smooth, poured concrete (like precast panels) provided ALL traces of the form release chemicals are removed and the surface is either roughened and/or prepared with a compatible gritted bonding primer of some kind. The gritted primer provides mechanical key for the plaster to adhere to and allows the plaster to be spread evenly without sliding. Allow primer to dry for 12 hours before applying LSB Finish plasters. Adding Limestrong Fortifier to the mix is recommended.

LSB INTERIOR FINISH was developed for application over drywall. The drywall must be properly prepared—taped, coated flat, sanded, and brought to (at least) a level-three quality finish. Screw heads are counter-sunk and filled and outside corners are beaded and filled. New drywall must be primed with a high quality latex based or PVA primer mixed with a grit to add a subtle roughness, or tooth. Limestrong Build sells a primer grit product to meet this requirement. Previously painted drywall (in most cases) can be covered with LSB Interior Finish after all hollows, pops and other damaged areas are filled and smoothed and a gritted primer has been applied over the entire surface. LSB Interior Finish is also suitable for use over an interior lime-plaster base coat.

UNSUITABLE SUBSTRATES. Do not use LSB Finish plasters directly on wood sheathing, like OSB, particle board, or plywood.

APPLY MASKING. Remember to first thoroughly and adequately mask off areas that don’t get plaster to protect sensitive surfaces. Lime plaster can stain unprotected surfaces—floors, wood, unglazed tile, stone or brick veneers.

DAMPEN THE SURFACE. If plastering on lime plaster or cement backer board, the surface must be dampened before application of LSB Coarse or Fine Finish plaster. If applying LSB Interior Finish over primed drywall, the surface is NOT dampened.

HAWK AND TROWEL APPLICATION. Move mud from the mud board (or bucket) to the hawk with a scoop or a kite-shaped mason’s trowel. The hawk is easiest to use and balance when the mud is loaded, carried, and balanced in the center of the hawk. Tip the hawk into the trowel and skim the mud with the trowel to load the trowel, then transfer the mud on the trowel to the wall.

KEY: When applying plaster, the loaded trowel is always moved in an upward stroke. The next loaded stroke starts lower (overlapping the tail of the previous) and moves up. By working in repeated, overlapping up-strokes, the mud stays on the trowel until pushed onto the wall. At the completion of each stroke, move the trowel in a sweeping circular motion to one side, which helps break the suction between the trowel and the mud and does not pull the mud back off the wall.

Work with a wet edge, blending one section of work into the next. Complete an entire wall or wall section before moving on.

APPLICATION THICKNESS. If using LSB Fine Finish, the finish coat goes on at a sixteenth (1/16) to one-eighth (1/8) inches thick; if using LSB Coarse Finish, apply at a one-eighth (1/8) up to one-quarter (1/4) inch thickness. LSB Interior Finish is applied in two thin (1/16-inch) coats to an 1/8-inch overall max thickness.

FINISH TEXTURES

Once applied and troweled tight, various subtle surface textures can be achieved depending on the float type and the method used. It’s best to figure out the look and master the technique for achieving that look on practice panels well ahead of time.

Examples of surface texture types and techniques include:

- **A trowel-worked surface texture**, which shows the subtle swipes of the tool, can be achieved by bringing the finish coat of the working area to proper thickness, then doubling back over it, working the trowel in random directions. For added contrast-depth, a bit more plaster can be skimmed onto the surface as you work, providing a drop-out, skip-marked effect. Keep the working edge wet as you advance across the wall, so you can seamlessly blend the worked pattern over the entire wall.

- **Dragged patterns** of various kinds can be achieved using some kind of texturing tool on the wet plaster. This is a **timing-critical process** and should be done evenly and in a single pass to achieve pleasing results. Typically, the dragged pattern is set

__FOOTNOTES [0]__

[5] Limestrong Fortifier is a polymer-based lime plaster additive that provides increased bonding over hard-to-bond substrates.

[6] Prepare cement backer board by counter-sinking screw heads and filling with lime plaster, taping seams with fiberglass mesh tape, filled to level with lime plaster, roughened and allowed to cure. Limestrong Fortifier should be also be added to the mix to strengthen the bond.

[7] Limestrong Primer Grit is sold in a 3-pound pouch, enough to provide a subtle toothy grip to 5 gallons of primer. Choose a quality primer formulated for the substrate, whether concrete or drywall. The grit is made from lightweight pumice aggregate and stays in suspension once mixed in.
into the wet plaster after first allowing it to firm up slightly, then returning with a clean trowel to lightly knock down and soften the
effect of the texture. Such finishes and timing should be worked out on practice panels first.
  - A wood float works to create a subtle matte texture by breaking loose bigger grains of sand and dragging them around,
under pressure, cutting into the surface. Allow the finish coat to reach the half-dry (50%) stage, then, using a dampened wood
float, scour the surface in a swirling pattern with light-to-moderate pressure.
  - If a more aggressively textured, sandy surface is desired, use a stucco sponge float. To achieve the look, allow the finish coat
to reach the half-dry (50%) stage, then dampen the sponge float and work the surface in a swirling pattern. This type of finish
texture provides a light-dispersing matte look with mottled color.
  - A tight, smoothed-troweled surface, showing very few trowel marks, is achieved by allowing the finish coat to dry slightly,
then, using a clean trowel (and a misting of water if necessary), further tighten and compact the plaster grains, taking care to avoid
creating trowel-edge marks.

To achieve a tight, smooth finish, dampen the leveling coat (or substrate, if applicable), and then apply a tight, thin coat of LSB
Fine Finish. This initial finish coat should be just thick enough to overcome the gritty surface on the leveling coat left by the sponge
float. As the moisture from the initial finish coat gets drawn into the leveling coat, another “double back” coat should be applied
directly on top of the still-damp first coat. As this second coat dries up, it can be dampened with a bit of water and finished smooth
with a stainless steel trowel.

Again, experiment with surface textures on practice panels to determine the correct method, timing, and tool choice that best
achieves the look you’re after.

**ADDING COLOR**

Color is either added to the finish coat mud mixture or applied as a limewash. The methods for mixing in liquid or dry-pigment
colorants were provided earlier, under Instructions for Mixing Limestrong Build Finish Plasters. A limewash, on the other hand, is
added after the finish coat has cured.

Lime finish. An alternative to pigmenting the finish coat is to use a limewash. A limewash is a mineral-based (lime) paint that
creates a subtle matte finish with a soft and porous feel that becomes integral to the plaster surface. Allow the finish plaster coat to
fully cure before application. Limewash is applied in at least two coats. Allow at least 12 hours between limewash coats for curing.
It is necessary to mist the plaster surface before application. The color-tinted limewash is applied using a large, natural-bristle
brush and scrubbing it into the texture of the plaster using a consistent pattern. See the LSB publication: Mixing and Applying a
Limewash for complete instructions.

Because Limestrong Build lime plasters contain no gray Portland cement, but rather bright-white lime and near-white pozzolan,
it is an ideal base for rich mixed-in colorants or worked-in limewashes, providing resonant, enduring color—color that is integral to
the finish, color that mellows to a beautiful, distinctive patina as it ages. Limestrong is also beautiful left at its natural off-white.

**LIMESTRONG SOAP FINISH**

An optional Limestrong Soap Finish (interior use only) will give the plaster a silky feeling and will also increase stain resistance
and wipeability. The olive-oil soap finish is applied after the plaster finish coat has completely cured. Limestrong Soap Finish
comes concentrated and needs to be diluted 8 parts water to 1 part soap. See LSB Publication: Applying a Soap Finish for
complete details on the process.

**CURING LIME PLASTER**

Cure time between coats depends on thickness of the coat and the atmospheric conditions, which could be anywhere from
3 to 5 days to twice that. An ideal lime plaster cure is attained in 7 to 10 days. Don’t rush it. Lime plaster gains strength as it cures:
the better the cure before next coat is hung on, the better the overall strength and performance of the plaster rendering overall.
Curing times tend to be faster in warm weather (as long as moisture is present in the plaster) and slower in cold weather.

**IMPORTANCE OF PROPER CURING.** The functional performance that lime plasters are famous for—elasticity, permeability,
self-healing, and so on—is achieved in the first and the last of the three primary stages of the application process: the mixing
and the curing. The mixing stage keys on the quality of sand and adequate mixing time to properly hydrate the binder and integrate the aggregate (sand). The curing stage is where the plaster gains its slow-acquired strength while building elasticity, breathability, and aesthetic beauty.

**Provide Surface Moisture.** Lime plaster doesn’t cure like paint—by drying out. Rather, lime plaster cures (consumes moisture) via a molecular-level chemical reaction, and that reaction needs time and adequate internal moisture to work properly—to attain strength and other functional properties. You MUST keep the surface of the curing plaster misted and moist. The point of the misting isn’t to add water to the lime plaster, rather, you’re providing surface water for evaporation, which keeps the internal water inside and available for the curative chemical reaction processes. If you let the plaster dry out, you’re NOT going to be able to put moisture back into the plaster to feed the chemical reaction by squirting it on the surface. It’s too late then.

As soon as the newly-applied plaster surface has set enough that misting won’t cause surface erosion, moisten the curing plaster by misting with a Hudson-type sprayer with the spray-tip set to dispense a fine mist. A backpack-type sprayer can also be used. The point of using the mist-setting on the stray nozzle is to get water onto the wall without damaging the surface. If you wait to moisten the plaster until it’s hard enough to withstand the impact of the spray from garden hose, you’ve waited too long. Mist the plaster as soon as the surface firms up and the wall begins to appear—slightly—lighter. Stay on top of it! Moisten but don’t saturate the curing plaster. Apply until the plaster no longer takes the water and it begins to bead on the surface. Do NOT apply until runoff.

**Temperature Affects Cure Rate.** Again, the rate of chemical hydration taking place within curing lime plaster is temperature dependent. A lime plaster render cures more quickly in warm temperatures as long as it stays moist. In colder temperatures, it slows way down and almost stops, and a complete cure takes much longer.

**Avoid Freezing.** If the plaster is allowed to freeze—especially during the first 24 hours of curing—all kinds of damage is done. The possibility of freeze-damage goes down the longer the plaster is allowed cure without freezing, as more internal water is consumed by the chemical reaction cure and less is available to freeze.

**Plan It Out.** A successfully-cured lime plaster rendering begins with a thought-through plan BEFORE the first batch of mud is mixed and applied to the wall. Think through it—how, when, and in what wall/surface order you’re going to approach the application. What is the best time of day to work on each wall? Consider the climate and season, and in particular, the expected temperatures, wind speed and direction, shade coverage, and so on. Will you need to provide some screening protection?

- Scaffolding will provide the framework to carry the protective screening of the newly applied plaster against adverse weather conditions.
- Use shade screens and/or mist often to protect against drying from direct sunlight.
- Protect fresh plaster against direct rainfall.
- If using plastic sheeting, do not allow it to contact the fresh plaster, as it will collect condensation and stain the plaster.
- If used, leave the screening protection in place (and in good repair) for several days after application of the final coat to provide the proper curing conditions.
- In colder weather, plaster should not be applied in frost conditions or when frost and freezing is likely during the first two to three days of curing.

**Shrinkage Cracks.** Small shrinkage cracks may develop in the scratch and leveling coats of lime plaster. These cracks are typically short and numerous. Shrinkage cracks are considered normal in thicker scratch and leveling coats and should not translate to the finish coat of functionally cured before finish coat is applied. However, long, thin hairline cracks could be an indication of structural movement and should be evaluated. These types of movement cracks (especially on structures with wood framing) will likely telegraph through the finish coat.

- **Preventive Measures.** Shrinkage cracking can be (somewhat) mitigated by following proper procedure at two key parts of the application process: mixing and curing. Overly-wet-mixed plaster is more likely to exhibit shrinkage cracks as it cures. Keep in mind that the key to easy-to-work lime plaster isn’t always more water, but, often, longer mixing time to “fatten” the mud.

**Cross References**

[XR7] See LSB Publication: Plaster Tools and Equipment—Figure 07

[XR8] See LSB Publication: Sourcing Sand
Same when re-tempering: start with just a little water and a lot of blending to return the plaster mud to workability—that blending/mixing time (whether done with a trowel in the mud board, in the mud tub with a drill-attached paddle, or in the mixer) has a big effect on the re-tempered workability. Second, proper and as-need misting of the wall during cure also reduces cracking. A third shrinkage-crack mitigating factor is the keying of the surface—a roughened or scratched surface breaths and cures more evenly.

• Repair: When/if shrinkage cracks develop in the leveling (brown) coat during the early stages of the cure—the first 24 hours—they can be dealt with by moistening the surface and, using a wooden float, rubbing in a firm, circular motion to tighten the plaster grains and fill the cracks. Re-key (roughen; add tooth) if necessary.

COVERAGE
Calculating the surface coverage of a bag of LSB Binder is greatly affected by the following factors:

1) Coat type—scratch or leveling.
2) Texture-depth of substrate (scratch coat). For example, substrates such as straw bale, lath-covered wood or EPS foam, mortar-stacked cement blocks or poured hemcrete all present a different texture that the scratch coat must fill and bind to.
3) Mud-mixture richness. For example, a leveling coat uses a sand-to-binder volume ratio as high as one-part LSB Binder to 2.5 parts sand. A rich scratch coat, on the other hand (for straw bale or hemcrete) calls for one part binder to one-part sand.
4) Applied coat thickness and consistency of depth.
5) Application method. Spray applications take more plaster, as inevitably, some material is spent as overspray and ends up on the masking materials or shot past the edges.
6) Care of application. Depending on the skill and care taken during application—whether taken from hawk to trowel to wall or follow-behind troweling of a sprayed-coat, some material ends up on the ground.

The ONLINE CALCULATORS available on the limestrongbuild.com website will provide coverage estimates based on the various parameters chosen—square footage, coat type, application thickness, application method, and substrate. These calculated estimates will provide the number of bags needed to complete the job. Best to order a bit more material for contingencies (like waste-loss and the occasional over-applied thicknesses).

SAFE USE PRECAUTIONS
Limestrong Build™ plasters contain hydrated (slaked) lime, which (because of a high pH) is somewhat caustic. Breathing the powder dust can also cause respiratory irritation. BE SMART. Protect yourself. In all situations, if irritation develops, seek medical attention. Please read our Safe Use Precautions and Treatments publication for information on protecting and treating skin, eyes, and breathing function.

FOOTNOTES [0]

[8] Shrinkage cracks are rarer in the scratch coat because the scratch-keyed surface breaths better and tends to cure at a more even rate. Any shrinkage cracking that does occur, once the scratch coat is functionally cured, will not telegraph through to the leveling coat.

CROSS REFERENCES [XR]

[XR9] See LSB Publication: Safe Use Precautions and Treatments; Limestrong Build Safety Data Sheet (SDS)