THE STUCCO INSTITUTE NEWS LETTER

Stucco Information by and for Stucco Applicators
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17 Stucco Myths for Climate Zones 1 and 2

Stucco Facts and Understandings

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Code Climate Zones: 1 and 2

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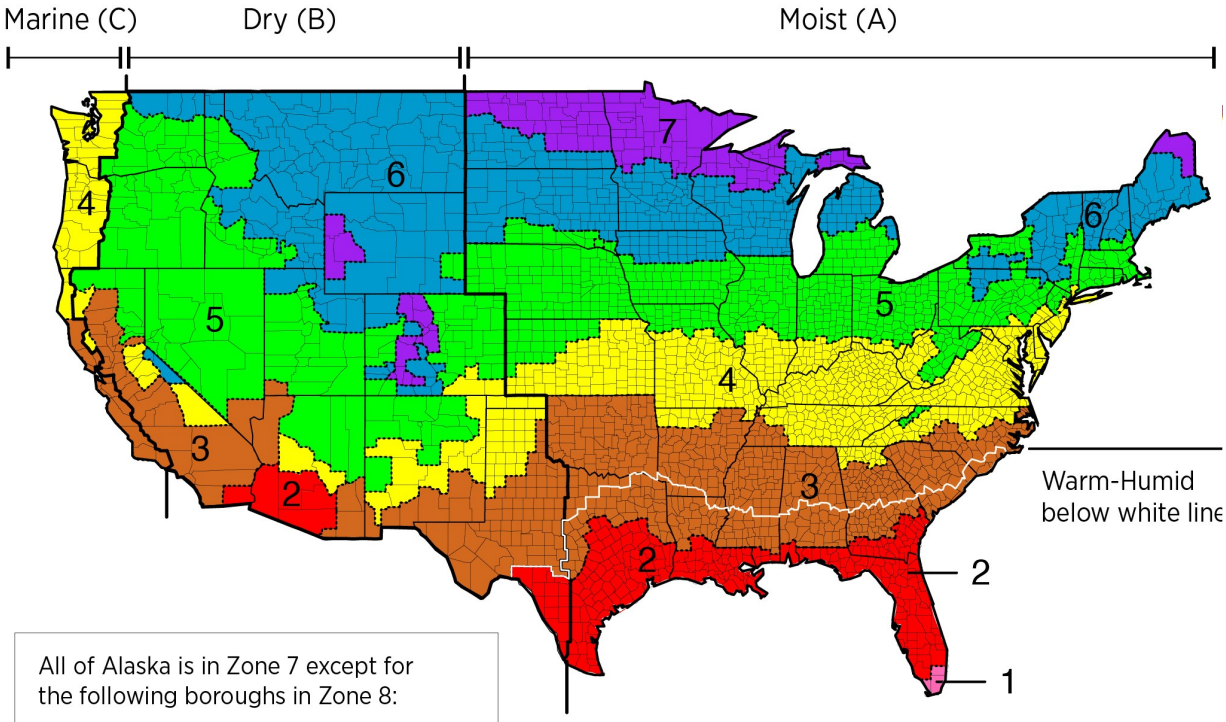

All of Alaska is in Zone 7 except for the following boroughs in Zone 8:

Bethel, Northwest Arctic, Dellingham, Southeast Fairbanks, Fairbanks N. Star, Wade Hampton, Nome, Yukon-Koyukuk, North Slope

Zone 1 includes Hawaii, Guam, Puerto Rico, and the Virgin Islands

STUCCO MYTHS, FACTS AND UNDERSTANDINGS

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Note, if the reader is not familiar with “Concealed Barrier vs Face Barrier Systems, it is suggested that they review the publication titled the same at the Stucco Institute.

UNDERSTANDINGS

The application of portland based cement plaster (stucco) seemingly is a simple process; mix some powdered cement, lime, and sand (or mix preblended bags with or without sand) with water to form a paste and apply it to the wall. Seems a benign process, however the complexities are vast and needed modifications from base line application standards and procedures are required for varying regional climatic conditions in order to provide a workable building envelope system.

When stucco is applied directly to cement masonry units (CMU's) *a/k/a "Blocks"*, poured cement or other similar base material, it is referred to as a "**Direct Bond**" application or simply stated as "Direct Applied" stucco. If it is installed over metal or wire lath (usually over a wood framed or sheathed wall) it's considered a "keyed" application (a metal or wire lath is fastened to the wall framing serving as a mechanical locking "key" when the wet plaster is forced through its openings). This referred to as an "**Indirect Bond**" or "lath" application.

The current ICC (and Florida) codes contain some prescriptive international provisions for the application of stucco as well as referencing the ASTM C926 "Standard Specification for the Application of Portland Cement-Based Plaster" as an application standard. For indirect bond applications (direct bond will be addressed later) these metal lath provisions evolved from an early 1970s ANSI standard using the code design wall pressures of 10 psf for all inland areas and 25 psf for coastal regions. The referenced application methodology outlined was most commonly used in more "midwestern" regions. It employed concealed barriers for water management and installations were mounted upon open framing (vertical studs left open or covered with a non-structural sheathing such as fiberboard).

Wall sheathing (or open studs) were commonly covered with 15 lb. organic felt for water management, then a metal or wire lath was attached to the wall studs to serve as a mechanical "key" for the cement plaster application. Stucco was then applied by way of a 3/8" thick cement scratch coat followed by a 3/8" thick cement brown coat. Both coats were allowed to cure.

Lastly, the cured brown coat was then covered with a thin shell of cementitious colored (1/8") plaster serving as the wall application's final finish coat. No paint or coating was contemplated (or needed) since the final shell finish coat of decorative cement could be white or gray based cement and tinted with powered dyes (or pre-colored in a bag mix). Virtually any color the owner desired could be mixed or purchased.

This type of colored cement shell finish can provide a virtually maintenance free exterior. However it does have some application drawbacks and limitations - and regional climate conditions can be detrimental to its performance.

First, on **direct bond** systems, a 3/8" level suction base coat (to which the last 1/8" final shell colored stucco coat is applied) must be applied, densified, rewetted and allowed to cure (usually 5 days). This then cured 3/8" base coat is used to provide a uniform suction plane so the final shell color coat will hydrate and cure evenly providing a uniform wall finish color. Otherwise the colored stucco will appear blotchy and mottled if it dries/cures/hydrates unevenly. (this applies to indirect bond finish coats also). Applying and curing this 3/8" base coat over direct bond applications adds cost and time to the project.

Second; the colored stucco does not work well in regions of high humidity especially where average outdoor humidifies are greater than the indoor humidifies. In these regions, the vapor drive is from the outside through the plaster assembly towards the inside.

On **indirect bond** applications (over metal / wire lath), this can lead to high moisture gains behind the plastering sub-cladding creating efflorescence, condensing vapor, corrosion, fungal growth, and pollutant staining from migrating impurities. On **direct bond** applications, this can lead to visual telegraphing of the mortar joints, poured cells, poured columns, etc. All as a result of high humidity loading.

In these high-humidity regions, both system application methods usually result in shell finish color coat that is blotchy, mottled, uneven, and marked with substrate telegraphing rendering the colored shell finish visually unpleasant and functionally inefficient. These will appear within the finished coat even though there is an adequate cured base coat behind it. Therefore, proper face barrier systems have always been the preferred method in these high humidity regions in lieu of the colored shell finish systems.

It is for these reasons, among others not discussed herein, that the referenced standards need to be modified for climatological application, and/or when a different system such as a "Face Barrier" system is being employed. See the publication paper titled; ***"Concealed Barrier versus Face Barrier Systems."***

As previously mentioned, to apply stucco over a framed wall, metal or wire lath has to be attached to the exterior wall and the cement plaster "keyed" (wet material pushed into the openings) thereby securing the stucco cladding and completing the system as a wall attachment.

The ASTM C1063 is titled: "Standard Specification for Installation of Lathing and Furring to Receive Interior and Exterior Portland Cement-Based Plaster" and is intended to address this metal lath / wire application process.

As with the ASTM C926, this document was also developed for a more midwestern application methodology resisting minimal wind loading. In these regions, the metal wire or lath attachment (and accessories) were placed over open framing or non-structural sheathing in geographic areas subject to low wall pressures. Modifications have to be made to the standard (especially regarding its attachments) when the wind speed is over 115 Vult (velocity ultimate in mph), or where wall pressures exceed the 25 psf original design parameter, or when lath is placed over Structural Wall Panels.

The South Florida Building Code, (later included in the Florida Building Code as the High-Velocity Hurricane Zone; *a/k/a HVHZ*) - officially adopted in the 1950s, eventually recognized the ASTM C926 for it's mixing and proportioning information, but excluded its thickness table because the table's basis was to provide a base coat for the even curing of the colored overcoat which was rarely used in high humidity regions.

In these high-wind, high-humidity regions a face barrier coating *a/k/a "paint and sealants",* was placed over the wall to provide color and resist both bulk water and vapor migration. Therefore, direct bond stucco over a wall (prior to coating) was purely cosmetic and only needed to be applied as a "Skim Coat" as defined in the ASTM 926.

The South Florida building code and it's HVHZ provisions never adopted the ASTM 1063 for the application of metal/wire lath because its fastening patterns could not be used in a high wind region and it's detailing and accessory integration was designed for colored stucco shell finish application, over open framing or non structural sheathing - none of which are common in high wind regions of Florida.

These developed standards were never intended to be "global" application standards with the intention that all provisions be considered as "mandatory" or be codified in any code. Accordingly, the standards are rife with provisions to allow modifications as needed. Since the standard was written by trained plasters, to be used by trained plasters in real time during the application process, changes or modification of these provisions were originally left up to the plaster.

The following is a list of modifying and informational statements contained in current and past ASTM C926 and 1063 standards along with other industry standards which recognize and bestow the right and need for regional and climatic modifications to referenced stucco installation provisions. This list is followed by a list of common myths attributed to stucco regardless of its location and region.

ASTM C926 CONDITIONAL STATEMENTS

5. Requirements for Bases to Receive Portland Cement- Based Plaster 5.1 Metal bases and accessories used to receive plaster shall be installed in conformance with Specification C 1063, except as otherwise specified.

A1.6.1 Metal plaster bases, backing, attachment, and accessories to receive plaster shall be examined to determine if the applicable requirements of Specification C 1063 have been met unless otherwise required by the contract specifications.

A2.2.2 At the bottom of exterior walls where the wall is supported by a floor or foundation, a drip screed and through- wall flashing or weep holes or other effective means to drain away any water that may get behind the plaster shall be provided.

A2.1.3 Sealing or caulking of V-grooves, exposed ends, and edges of plaster panels exterior work to prevent entry of water shall be provided.

A2.1.4 To reduce spalling where interior plaster abuts openings, such as wood or metal door or window frames, or fascia boards, the edge of three-coat plaster shall be tooled through the second and finish coats to produce a continuous small V-joint of uniform depth and width. On two-coat work, the V-joint shall be tooled through the finish coat only.

Note the difference between V Groove and V Joint - See newsletter at Stucco Institute for further information.

ASTM C-1063 CONDITIONAL STATEMENTS

1.1 This specification covers the minimum technical requirements for lathing and furring for the application of exterior and interior portland cement-based plaster, as in Specifications C841 or C926.
Note this ties the ASTM 1063 to the ASM C 926 - C 841 is for interior plastering

7.10.1.2 Lath shall be applied with the long dimension at right angles to the supports, unless otherwise specified.

6.3.2 Foundation Weep Screed—Accessory used to terminate portland cement based stucco at the bottom of exterior walls. This accessory shall have a sloped, solid, or perforated, ground or screed flange to facilitate the removal of moisture from the wall cavity and a vertical attachment flange not less than 3-1⁄2 in. (89 mm) long.

7.11.3 Casing Beads—Non-load-bearing members shall be isolated from load-bearing members, and all penetrating elements, with casing beads or other suitable means, to avoid transfer of structural loads, and to separate from dissimilar materials.

COLOR COAT STATEMENTS FROM THE STANDARDS

Note, these following excerpts (and others) denote conditions that can affect plaster color coat curing. These factors are some of the reasons the cement color coat system is NOT used in hot - humid climates such as found in zones 1 and 2

X1.1.4 Color material for integral mixing with plaster…. Color uniformity is affected to an even greater degree by variations in thickness and differences in the suction of the base.
X1.2 Finish Coat Categories (applicable to both natural and colored finishes)
X1.4 Staining of Plaster ….
X1.4.1 Staining of plaster due to entrapment of moisture behind the plaster…
X1.4.2 Integrally colored plaster can be discolored or altered in shade if subjected to moisture, either from uncured base coats or external sources, such as rain, too soon after applications.
X1.5.2.3 The amount of water and the timing for curing portland cement plaster will vary with the climatic conditions, the type of base, and use or nonuse of water-retentive admixtures.
X1.5.2.4 Some moisture must be retained in or added back to freshly applied portland cement-based plaster. If the relative humidity is relatively high (above 75 %), the frequency for rewetting a surface may be reduced. If it is hot, dry, and windy, the frequency of rewetting must be increased.
X1.5.1.1 After all ingredients are in the mixer, mix the plaster for 3 to 5 min.
X1.5.1.2 The amount of water used in the plaster mix should be determined by the plasterer. Factors such as the suction of the base, or of the previous coat, water content of the aggregate, drying conditions, and finishing operations should be considered in determining water usage…
X1.1.4 Color material for integral mixing with plaster should not significantly alter… The use of white cement with the desired mineral oxide pigment color material may result in truer color.
X1.1.4.1 The uniformity of color cannot be guaranteed by the materials manufacturer of the component materials or by the applicating contractor. Color uniformity is affected by the uniformity of proportioning, thoroughness of mixing, cleanliness of equipment, application technique, and curing conditions and procedure, which are generally under the control of the applicator.

Color uniformity is affected to an even greater degree by variations in thickness and differences in the suction of the base coat from

one area or location to another, the type of finish selected, the migration of color pigments with moisture, and with job site climatic and environmental conditions. These factors are rarely under the control of the applicator.

7.6.2 The use of excessive water during the application and finishing of finish-coat plaster shall be avoided.

7.7 Fog-Coat Application—Job-mixed or factory-prepared fog coats shall be applied in accordance with the directions of the manufacturer.

X1.3 When specified as alternate for final coat, trowel- or plaster machine-applied textured acrylic finishes containing aggregate may be substituted for portland cement finish coats, provided brown coat is properly prepared and finish is applied according to the manufacturer's directions.

Note: now you begin to realize the extreme difficulty in installing a colored coat system in Climate Zones 1 and 2. That is why their usage is extremely rare. Face Barrier Systems have always managed these variables flawlessly.

ACCESSORY DEPTH

Note: accessories are sized with grounds to accommodate the base coat only and not the finish coat. For example, a 3/4" accessory is intended for a 7/8" stucco system (i.e., a 3/4" base coat and a 1/8" portland cement finish coat.

X1.5.2.6 Application of Plaster Basecoats: (1) Conventional, three-coat plaster is applied over a metal plaster base in two, nominal 3⁄8 in. coats. The traditional application brings the plaster brown coat out to the lathing accessories which are set to approximately 3⁄4 in. off the substrate. The lathing accessories that traditionally provide the plaster thickness screed point include the casing beads, used to terminate the plaster …

X1.5.2.6 Application of Plaster Basecoats: Conventional, three-coat plaster is applied over a metal plaster base in two, nominal 3⁄8 in. coats. The traditional application brings the plaster brown coat out to the lathing accessories which are set to approximately 3⁄4 in. off the substrate. The lathing accessories that traditionally provide the plaster thickness screed point include the casing beads, used to terminate the plaster into a dissimilar material, control and expansion joints installed in accordance with Specification C1063, corner transition trims, typically used at a vertical to horizontal transition, and outside corner reinforcement.

Note the difference in a control and expansion joint in the above text - two different functions.

MEASURING NOMINAL STUCCO THICKNESS

7.1.2 Plaster nominal thickness shall be measured from the back plane of the metal plaster base, exclusive of ribs or dimples, or from the face of the solid backing with or without metal plaster base, to the outer surface exclusive of texture variations.

The interface of other exterior wall envelope systems, such as door and window frames, metal flashings and surrounds, drift joint framing, and other components often create build up that the lathing and plastering must cover. Further impacting this build-up are self-adhering flashing and multiple layers of water-resistive barriers used to enhance the ability of the exterior wall to provide a weather-resistive exterior wall envelope.

In load-bearing wood framed and wood sheathed walls, build-up can occur from the wood and sheathing and any structural connection plates and bolts required to complete the structure.

As a result of these factors that can impact the thickness of the plaster and are usually out of the control of the plastering contractor, references to plaster thickness use the term nominal to qualify the required thickness. The term nominal is intentionally ambiguous so as not to unnecessarily burden the plastering contractor with an expectation to provide a thickness of plaster that cannot reliably be achieved. Nominal is a term commonly associated with lumber that was many years ago actually a dimensional reference, but due to changes in the manufacturing of studs and timber, has become simply a name, and not an exact dimension.

Note, It is the position of the Stucco Institute than when determining stucco thickness, the thickness should be averaged over a rectangular sample of 8" x 8" for indirect bond application.

HVHZ - SOUTH FLORIDA CODE

R4411-3.1.1 Portland cement based plaster shall be applied in accordance with ASTM C 926, excluding Table 4 of that standard. *(Thickness)*

R4411.3.2.2 Moisture barrier. Wood shall be covered with 15-pound (9 kg) roofing felt, or other approved equally moisture-resisting layer, and metal reinforcement as set forth herein.

R4411.2.3.4 Fastenings into wood sheathing or wood framing shall be by galvanized nails, with heads not less than 3/8 inch (9.5 mm) in diameter, driven to full penetration. using a minimum of two nails per square foot (0.093 m2), or by approved staples having equal resistance to withdrawal.

R4411.3.2.4.1 Stucco applied on metal lath shall be three-coat work applied to a total thickness of not less than 1/2 inch (12.7 mm) thickness except as required to meet fire resistance requirements.

Authors note: ASTM Fastening;
7" Vertical x 16" Horizontal = 112 sq.in. Tributary

Miami-Dade High Wind; 2 fasteners per ft^2

144 / 2 = 72 sq. in. Tributary

ASTM fastening tributary area is 56% (40 sq. in.) oversized compared to the HVHZ and are deficient in meeting wind resistant loading – Violates Florida Building Code in most all Florida regions.

CONTROL JOINTS AND CRACK CONTROL

From ASTM C926

A2.3.1.2 Prefabricated control joint members shall be installed prior to the application of plaster; therefore, the decision to use them, the type selected, their location, and method of installation shall be determined and specified in project specification sections other than the section on plastering.

From Minnesota Lath and Plaster Bureau and Minnesota Edition of the Building Code

(2007 MN Building Code Section R703.6.1.3)

Control joints and expansion joints. Provisions for the control of expansion shall be determined by the exterior plaster application designer. ASTM C 1063-03 Sections 7.11.4–7.11.4.4 do not apply.

From Minnesota Lath and Plaster Bureau

WHY CRACKS HAPPEN - WITH OR WITHOUT CONTROL JOINTS

Cracking occurs because stress exceeds the strength capacity of the stucco. Some examples of stress that can be imposed on stucco are: racking, twisting, cupping and shrinking of dimensional lumber, structural settling, compression, and truss uplift. Experience has shown that such stresses will impact the integrity of the stucco regardless of whether or not control joints have been installed. Contrary to reasoning, it is not unusual to see a wall broken up with control joints that still exhibits cracking, while conversely, a wall without control joints may remain pristine for several years.

The main reason for their lack of use (control joints) in residential applications is the simple fact that wall areas tend to be smaller than commercial installations. Stucco contractors are also reluctant to use them because they are aesthetically objectionable to homeowners. This is a matter of some controversy for commercial stucco installers who feel that there is a double standard that needs to be reformed.

With the growing trend of larger houses, comes the real concern that perhaps control and expansion joints should be introduced into larger wall areas. However, with their introduction into a wall area comes the added concern that these components open up another potential avenue for water entry into the wall assembly. The MN Lath and Plaster Bureau suggests that the use of control joints be discussed with the homeowner or his representative. As in commercial construction their use should be judged by the size and complexity of the wall area(s).

Now that you have reviewed conditional statements and some factual statements, let's review some common stucco myths.

17 COMMON STUCCO MYTHS AND FACTS

MYTH

THE ASTM C926 (STUCCO) AND C1063 (LATH)

#1
Stucco is to be applied to a total system thickness of 7/8” when installed over metal or wire lath attached to the framed wall members or wall sheathing (**indirect bond application)**.

TRUTH

Yes / No

The ASTM indirect bond (over lath) stucco system has ALWAYS required a 3/4” NOMINAL base coat thickness. This base coat is comprised of a 3/8” scratch coat and 3/8” brown coat.

The additional 1/8” thickness is for the application of a colored cementitious final shell coat. When other finishes are used - the 1/8” thickness is substituted for the chosen manufacturer’s thickness requirement.

So;

YES, if the application is a 3-coat system using a concealed barrier (drain plane) method for water management AND using an 1/8” colored cementitious finish over the 3/4” NOMINAL thickness base coat.

NO, if the final coat is to be an alternate coating which is allowed by its “Unless otherwise Specified” provisions and by its X1.3 Appendix “When an alternate finish coat is used….”

NO, If your application is a Face Barrier System (painted) such as common in Climate Zones 1 and 2.(the 1/8” final coat is not applied).

NO, if you are using the HVHZ provisions – they have ALWAYS required a total thickness of 1/2”.

MYTH

THE ASTM C926 (STUCCO) AND C1063 (LATH)

TRUTH

#2
Stucco is to be installed to a thickness of 1/2" when applied to cement blocks a/k/a CMU's or similar cementitious substrates (**direct bond application**).

Yes / No

The ASTM stucco system has ALWAYS required a 3/8" thick **cured** base coat to provide a uniform suction base for the application of it 1/8" colored shell coating in order to provide even color curing. As such, the total system thickness is 1/2"

So;

YES, if applying a 2-coat system using an 1/8" colored cementitious finish over the cured 3/8" base coat

NO, if you are using the "Decorative Cementitious Finish" provision of the code or the "Skim Coat" Provision of the ASTM. By and of itself, the code does not require CMU's to have any covering at all – so why would stucco need to be any specific thickness when applied?

NO, if the final coat is to be an alternate coating specified for cosmetic purposes. This is allowed by the provision "Unless otherwise Specified" and by the X1.3 Appendix "When an alternate finish coat is used…."

NO, if a Face Barrier System is being employed.

MYTH *THE ASTM C926 (STUCCO) AND C1063 (LATH)*	TRUTH
#3 Control Joints Control Cracking.	**No** Control Joints divide large walls into manageable plastering panel sections. When used, spacing is usually determined by building configuration and wall geometry (width and height). They serve as depth screeds to provide a flat face to the finished wall plane. The spacing is also a factor of the length of the “rod” the plaster’s are using. In sum, when used, they are for Panelization and Screeding purposes. No Scientific Data has ever ascribed crack prevention or crack control properties to them in an in-situ application. In fact, results from 2 recent full application testing panel models from two separate stucco associations (Nevada and Texas) indicate there was no meaningful difference in cracking patterns regardless of how the control joints were attached (wire tied or attached with fasteners – one or both legs). Or any meaningful difference in the test panel with NO control joints at all. Bucholtz said attributing crack control to these joints was the most asinine thing he ever heard intelligent men profess. Arguendo, over suspended ceilings using runners and cross furring, etc., (where the lath is not directly attached to the sub-framing, they ***theoretically*** could aid in collection of stresses during hydration (curing) but would never serve any benefit post hydration in any stucco application.

MYTH

THE ASTM C926 (STUCCO) AND C1063 (LATH)

#4
Control Joints are required at 144 sf. intervals, not to exceed 18' and not to exceed a ratio of 2.5 to1 – Therefore they must be installed along with other accessories such as outside corner beads

THE FOLLOWING PAGES EXEMPLIFY COMMON DESIGNS:

TRUTH

Yes / No

Depends. The standard itself provides these geometric dimensions as a PRESCRIPTIVE methodology - not a mandatory requirement. (see modification statements earlier). The standard is written for using a 3 coat, colored stucco application system. These joints serve as "screeds" to aid in uniform thickness and to break large wall areas into "panels" to control suction, and to break up the wall areas so that batches of "mud" (including the 1/8" shell color coat) are applied from a single batch within their boundaries without unnecessary waste. This also helps ensure the final finish coat "cures" (dries) as evenly as possible thereby providing color uniformity. Plasterer's rod length, mixer size, scaffold dimensions and building geometry have historically been spacing considerations used by plasterers in deciding where control joint are to be placed **when** they are to be used.

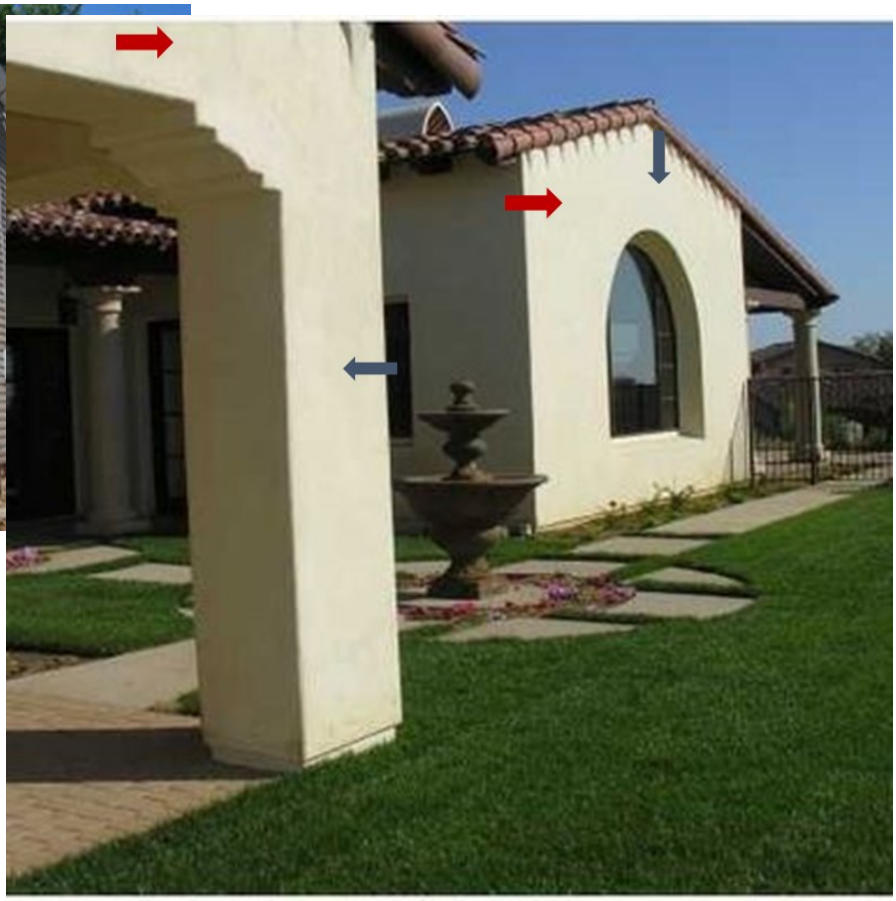
However, if the system is designed otherwise, such as a face barrier system, the color coat is eliminated. Therefore, the control joints (and other provisions) may be unnecessary. Building geometry (usually all residential construction is eliminated from their need) may make their use unwarranted. These conditions are allowed modifications by use of the "unless otherwise specified" or the "installed according to the contract documents" (and similar) provisions provided within the ASTM standards as allowable application modifications.

There is no requirement for outside corner beads within the standards. *See "Inspecting Stucco for Code Compliance" at the stuccoinstitute.com*

All Face Barrier Systems without weep screeds or control joints.
Since the inception of modern stucco, many residential and similar low rise designs never used these optional weeps, screeds or accessories. *See Newsletter; 35-Year-old Stucco Performing Perfectly*

Control Joint Omitted - **Weep Screed Omitted**

These accessory locations are prescriptively noted within the ASTM (but are omitted by the "unless otherwise specified or understood as not used in a face barrier system.)



These examples have no control joints, no weep screeds, no corner beads or other accessories and all are FULLY CODE COMPLIANT.

CONTINUED ON NEXT PAGE...

These examples have no control joints, no weep screeds, no corner beads or other accessories and all are FULLY CODE COMPLIANT.

CONTINUED ON NEXT PAGE…

Do you need Control Joints, Screeds and Accessories on an Application such as this? You bet - in such installations, they are a critical panelization element for maintaining a flat surface! But they still do not provide any “crack reduction or crack control” benefits.

Control Joints Needed for Panelization and Screeding!

MYTH

THE ASTM C926 (STUCCO) AND C1063 (LATH)

#5
The Standards are Design Documents.

TRUTH

No

The Standards are “Application Standards” written by experienced plasters to be used (and understood) in real time by experienced plasters in the field (wet curing for example). The standards were never written for code or design intent although they certainly can aid in design.

The standards were developed for Open Framing (or covered with non-structural sheathing such as asphalt impregnated sheathing or Styrofoam) in an arid region with sustained winds of 90 mph or less. When the standards were developed, the code ascribed horizontal wall pressures for building less than 30’ in height was 10 psf for inland areas and 25 psf for coastal regions. These loading conditions were used during the standards development and haven’t changed over time.

According to our code, prescriptive standards are not to be used when the Vult is in excess 115 mph or the wall loads are in excess of 30 psf. Attach your lath according to the standard’s provisions. (7” vertically to 16” horizontally placed studs) and you will most likely VIOLATE our code provisions. (see tested attachment tables at the stuccoinstitute.com)

Failure mode is not normally the fastener’s resistance to direct withdrawal, it is rather the bending rupture due to the horizontal fastener spacing leaving a 16” wide (by 8-10’ vertical) unrestrained void that fails in negative loading.

In all cases the wind loading provision of both the Building and Residential codes require compliance with their wind loading provisions and requirements.

MYTH

THE ASTM C926 (STUCCO) AND C1063 (LATH)

#6
The Standards require all fasteners to be in the vertical framing members and the thickness of the sheathing to be added to the fasteners leg length.

TRUTH

Yes / No

Yes, if you are attaching over open framing or attaching to the vertical framing members when applying over non-structural sheathing.

No, if you are applying over a structural panel with withdrawal values published in the National Design Standard (any structural rated panel). Attach anywhere on the panel – its all structural for withdrawal values.

And the “oh you will penetrate the drain plane” – all fasteners penetrate the drain plane.

And the “oh, you will allow water to pass around the fastener leg since it not sealed” – besides the absurdity of the concept – would you would rather the water absorb into (and decay) the vertical stud being used as part of the shear wall?

These are fallacies of course. When using a face barrier system, the bulk water and vapor is blocked at the walls outer plane making these hypothetical contentions moot.

With a tradition water management system (drain plane) over open framing or non-structural sheathing the vertical framing members are the ONLY fastening points available - explaining the context of the standard’s text.

MYTH

THE ASTM C926 (STUCCO) AND C1063 (LATH)

#7
Cement Plaster must be installed in 3 separate and distinct coats, each allowing to cure before the successive coat can be applied.

TRUTH

Yes / No

Yes, if you are installing stucco over metal lath/ wire installed over open framing or over most non structural sheathing. The scratch coat must be gently applied (the lath bends between studs), then allowed to cure thereby providing enough lateral support for the horizontal pressures exerted during the next successive (brown) coat. That coat must cure before the final 1/8" shell colored coat is applied in order for it (the colored coat) to dry (cure) uniformly maintaining an acceptable finish.

No, When structural panels serve as the sheathing under the metal lath (or non-structural sheathing of sufficient resistance is used) the ASTM standard prescribes the following as the preferred method:

C 926 - 3.2.9.5 double-up coat—the brown-coat plaster applied to the scratch coat plaster before the scratch-coat plaster has set.

X1.4.2.2 In order to provide more intimate contact and bond between coats and to reduce rapid water loss, the second coat should be applied as soon as the first coat is sufficiently rigid to resist cracking, the pressures of the second coat application, and the leveling process.

Note, If using a 1/8" shell finish colored coat, this brown coat must cure before the application of the colored coat. The desired finish texture is applied as part of the color (3rd) coat.

If using a face barrier system, the final texture is applied at this time, then the stucco is usually required to remain open until the PH is reduced to less than 10. The wall can be coated (3rd) coat and sealed at that time.

MYTH

GENERAL PROPERTY MYTH

#8
Stucco is the same as Concrete, i.e., Stucco strength properties are similar to concrete.

TRUTH

No

- There are no standards which stucco mix must meet aside from durability and appearance
- It has no standard of hydration testing
- It has no specific strength requirements
- It has no carbonation testing requirements related to moist curing time
- There is no justification for the testing of stucco

Excerpted from Bucholtz - Tips and Techniques

MYTH	TRUTH
GENERAL PROPERTY MYTH	
#9 Over sanding of the mix causes Cracking, i.e., Over sanding causes a weak mix and causes subsequent cracking.	♦ Stucco mix so over sanded as to significantly reduce the strength of the product cannot be worked off of the tradesman's hawk & trowel ♦ Usually under sanding or over liming causes a mix that is too rich ♦ When using Portland cement, lime should be avoided. There are admixtures that can be added (2-3 oz) that will provide the plasticity of lime without the over-richening affects *Excerpted from Bucholtz - Tips and Techniques* *Note, Our newer Type "S" Super Stucco Mixes need no additives or alteration for all normal applications.*

MYTH

GENERAL PROPERTY MYTH

#10
Wall Lath must be cut behind and control joint flanges must be wire tied to the lath independent of the sub-framing in order to control and prevent wall cracking.

TRUTH

No

- There is no evidence that control joints will assure cracking will not occur or will direct cracks to the joint
- Many buildings built without control joints experience cracking no different than ones employing them
- Another fallacy is that by breaking the metal lath behind the joint, the stucco will float as panels
- The lath is attached to the studs and the plaster attached to the lath – the plaster will not move independently of the lath. If one moves, so does the other

Source: Bucholtz, et al.

Note, In high wind regions the flanges must be anchored to the framing substrate so it will not initiate a vertical break plane under negative (suction) loading.

MYTH

THE ASTM C926 (STUCCO) AND C1063 (LATH)

#11
Window Frames MUST be separated from the stucco body with casing bead (stop).

TRUTH

No

ASTM C1063 says:

7.11.3 Casing Beads—Non-load-bearing members shall be isolated from load-bearing members, and all penetrating elements, with casing beads or other suitable means, to avoid transfer of structural loads, and to separate from dissimilar materials. The NOA may control method.

"V" Grooves are a code approved method to provide such separations and have been used since the inception of moder stucco many decades ago. They have performed (when used) without any failures and are fully code approved.

However, separation with a casing bead and the use of a backer rod is an acceptable method provided the window flange can accommodate it.

MYTH

THE ASTM C926 (STUCCO) AND C1063 (LATH) REQUIRE

#12

(ASTM C-926)

"Vertical surfaces must extend below horizontal surfaces according to A2.2.3 which states: "Where vertical and horizontal exterior plaster surfaces meet, both surfaces shall be terminated with casing beads with the vertical surface extending at least 1⁄4 in. (6 mm) below the intersecting horizontal plastered surface, thus providing a drip edge. The casing bead for the horizontal surface shall be terminated not less than 1⁄4 in. from the back of the vertical surface to provide drainage".

SEE EXAMPLE THIS PAGE

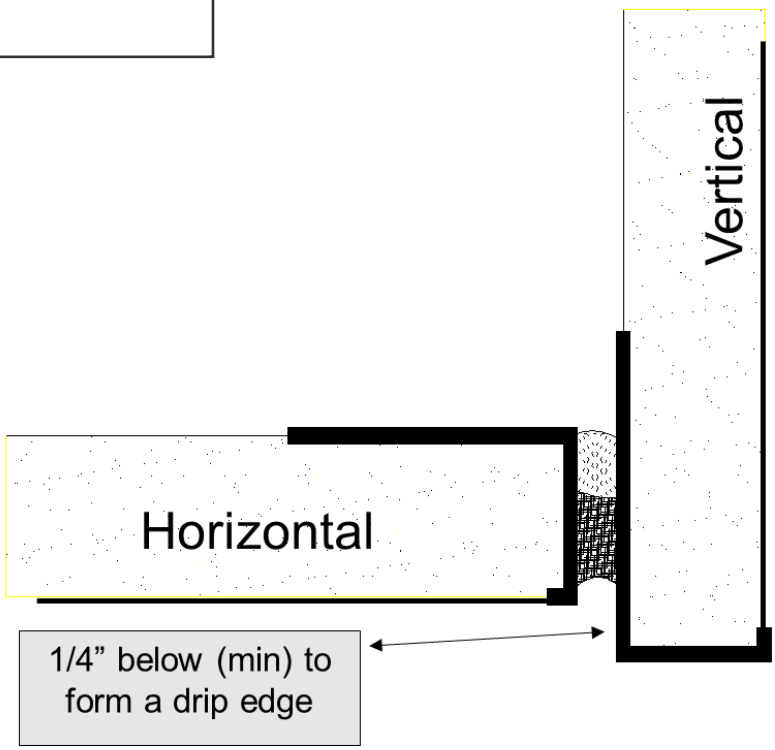
TRUTH

Yes / No

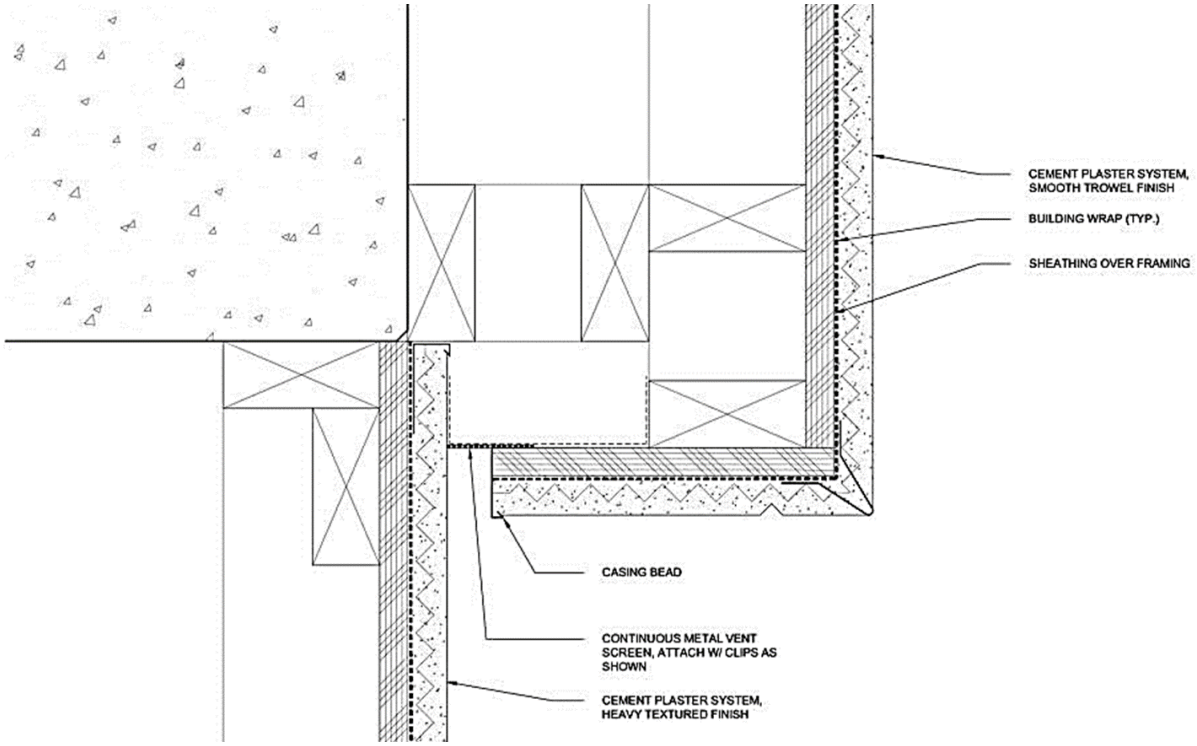
Yes, if the wall design uses a concealed water management system (drain plane) and the intersection is a vertical wall to horizontal ceiling.

No, if it is face barrier system or a simple covered beam.

SEE EXAMPLES ON NEXT PAGE:



These are examples of the many industry publications and drawings for such beam / soffit transitions to be used with either system. Both are fully compliant. Bottom photo depicts a fully compliant face barrier system installation at front entry beams.



MYTH

THE ASTM C926 (STUCCO) AND C1063 (LATH)

#13
Gable ends MUST have a horizontal weep screed at the base of the wooden truss at the CMU lintel intersection.

TRUTH

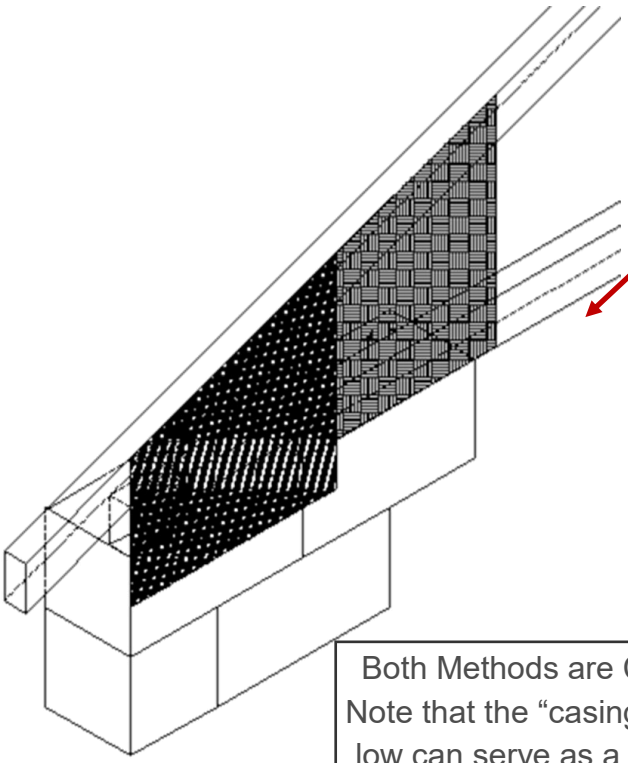
Yes / No

It is up to the designer. Using an **indirect bond** application over a concealed barrier water management (drain plane) system, the weep can either be solely at the bottom of the exterior wall or both at the horizontal truss line and the bottom of the exterior wall.

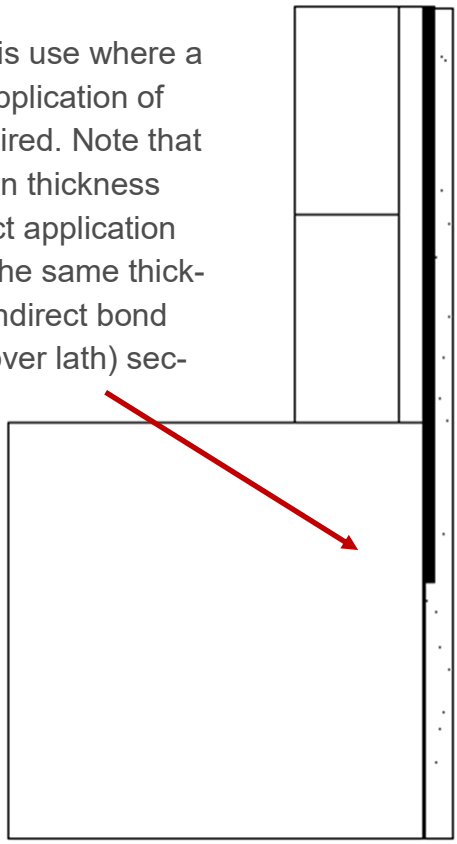
When the lower wall is **direct bond** (block), it is again up to the designer. Either place a horizontal screed or lap the metal lath down onto the block (CMU) using no weep at all. A continuous coat of plaster is then placed over the entire wall. Refer to option (3) from the standard below:

"A2.3.3 Where dissimilar base materials abut and are to receive a **continuous coat of plaster**: (1) a two-piece expansion joint, casing beads back-to-back, or premanufactured control-expansion joint member shall be installed; or (2) the juncture shall be covered with a 6-in. (152-mm) wide strip of galvanized, self-furring metal plaster base extending 3 in. (76 mm) on either side of the juncture; or (3) where one of the bases is metal plaster base, self-furring metal plaster base shall be extended 4 in. (102 mm) onto the abutting base."

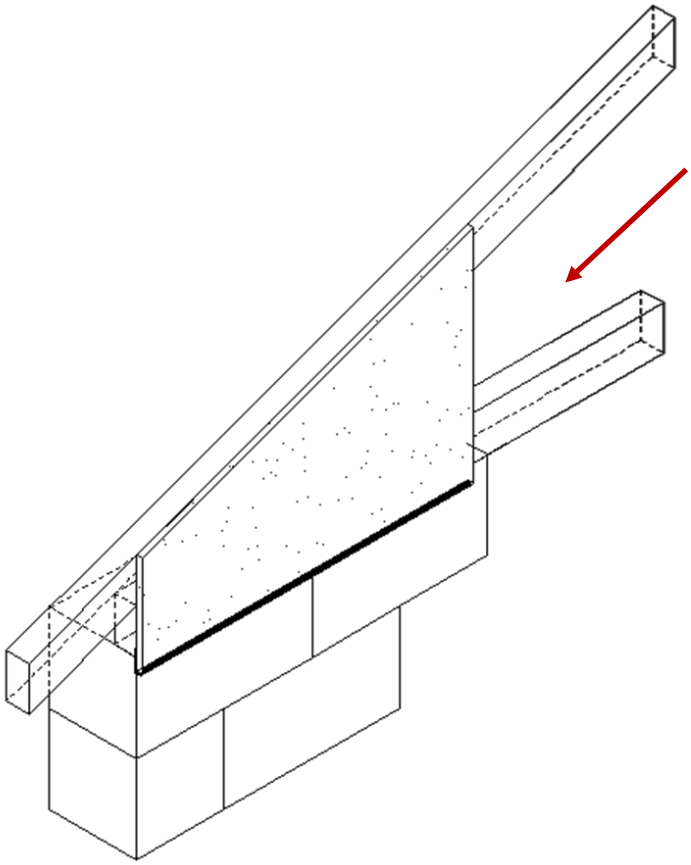
SEE DETAILS ON NEXT PAGE...



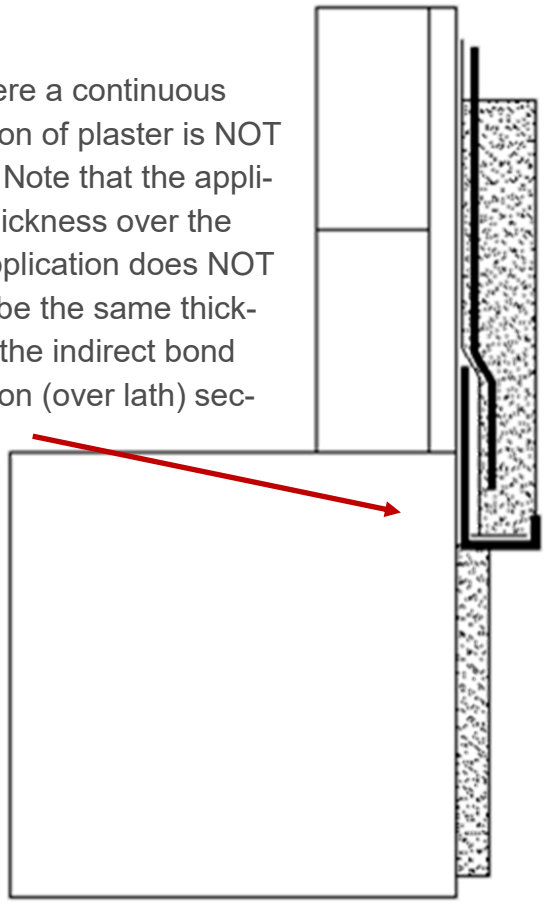
This method is use where a continuous application of plaster is desired. Note that the application thickness over the direct application needs to be the same thickness as the indirect bond application (over lath) section.



Both Methods are Code Compliant. Note that the “casing stop” shown below can serve as a “weep screed - It will weep at it capture flange . See ASTM C 1861



This where a continuous application of plaster is NOT desired. Note that the application thickness over the direct application does NOT need to be the same thickness as the indirect bond application (over lath) section.



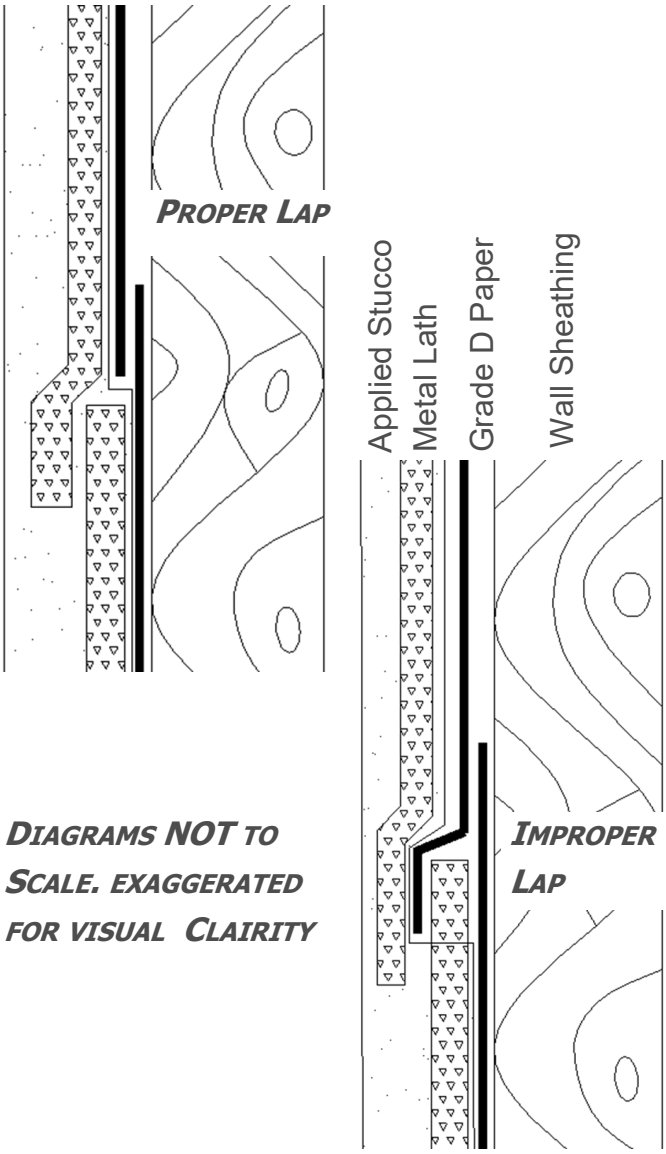
MYTH

THE ASTM C926 (STUCCO) AND C1063 (LATH)

#14 (per 7.8.3)

Where metal plaster base with backing is used, the vertical and horizontal lap joints shall be backing on backing metal on metal.

Note, this is an issue that can occur when paper-back lath is being applied.



TRUTH

Yes / NO-Conditional

Yes, when the system is being installed as a water management (drain plane) system. The paper must lap only the paper (metal must ALWAYS lap metal). This will ensure that:

(1) Any migrating moisture will continue downward towards the foundation (or other) weep screed.

(2) If the paper laps over the metal there will be a slight reduction in the stucco thickness. This can cause the final 1/8" color coat to cure unevenly and can lead to a future horizontal color line blemish along the finished wall.

(3) If the paper over metal lap if continues horizontally down a longer wall, it can cause a potential horizontal weakened point.

(4) The paper laps over the metal it will keep the inward metal lath from receiving the plaster. Although sufficient keying most likely will exist, the metal can become subject to migrating moisture.

NO-Conditional. These precepts apply to longer horizontal wall sections. Minor infractions of this condition around fenestrations and openings do not normally pose any problems. (*see full scale test building at stucco institute)*

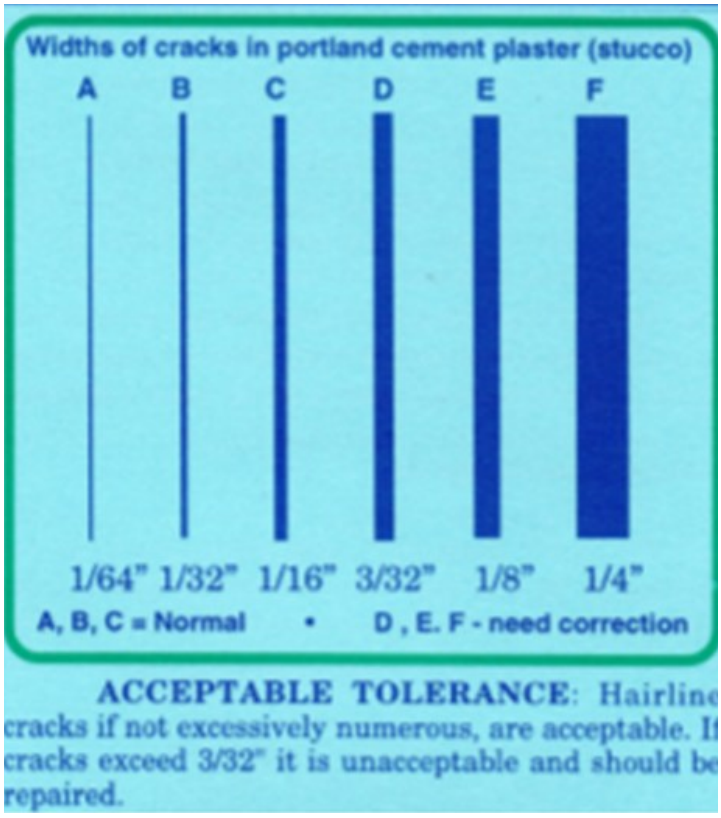
NO-Conditional. if the paper is being used as "bond breaker" layer over a water management layer, minor infractions are normally harmless.

NO-Conditional. if a face barrier system is used. Minor cracking is bridged by coating and moisture is managed at the walls face barrier. Minor infractions are normally harmless.

MYTH

GENERAL PROPERTY MYTH

#15
Minor wall cracking is normal and expected. Such cracking will cause **NO** measurable harm to the system.



Excerpted from Bucholtz - Tips and Techniques

TRUTH

Yes / No

Yes, When the applied system is an **indirect bond** (over lath) application and is being installed per the ASTM C926 and C1063 using its designated concealed barrier water management (drain plane) system with an 1/8" colored cementitious finish as a final colored shell coat.

It is an accepted fact that these stucco facades crack. The ACI-524 Defines and groups them as follows:

"14.2.1 General—Plaster cracks should be classified by type before determining a method of repair. Crack types include: shrinkage cracks, check cracks, plastic-shrinkage cracks, craze cracks, and structural movement cracks such as tensile stress cracks".

Bucholtz (in Publication 172) quantifies allowable lineal footage of cracks according to their width (see figure this page). He further states:

"Based on observation of thousands of stucco installations, suggest that the term "excessive cracking" can be applied to stucco when the total lineal footage of cracking exceeds one lineal foot of 1/16" cracks per 100 square foot of plaster. If cracks are 1/32", then two linear feet per 100 square foot of plaster can be considered normal. If cracks are 1/64th of an inch, then four linear foot per 100 square foot of stucco is not excessive".

"But excessive or not, cracks constitute an aesthetic problem that can be **easily remedied**. Let's get away from the irresponsible suggestion that stucco be removed and replaced".

CONTINUED ON NEXT PAGE...

MYTH

GENERAL PROPERTY MYTH

TRUTH

#15 CONTINUED...

Minor wall cracking is normal and expected. Such cracking will cause **NO** measurable harm to the system.

Yes / No

NO, over **indirect bond** (over lath) applications installed using a Face Barrier System. This system's final wall coating is applied in conjunction with sealants - both designed to reject bulk water and vapor at its outermost surface.

Although minor cracking can occur, most exterior waterproof coatings have a limited ability to "bridge" these occurrences and still protect the wall sub-assembly.

Unlike the water managed systems (meant for more arid regions where average outside humidifies are lower than interior), Face Barrier Systems are **not** meant to pass bulk water or high vapor. Accordingly, physical cracks, other than hairline (limited to ≈0.003 inch), should be overcoated with the original wall coating material.

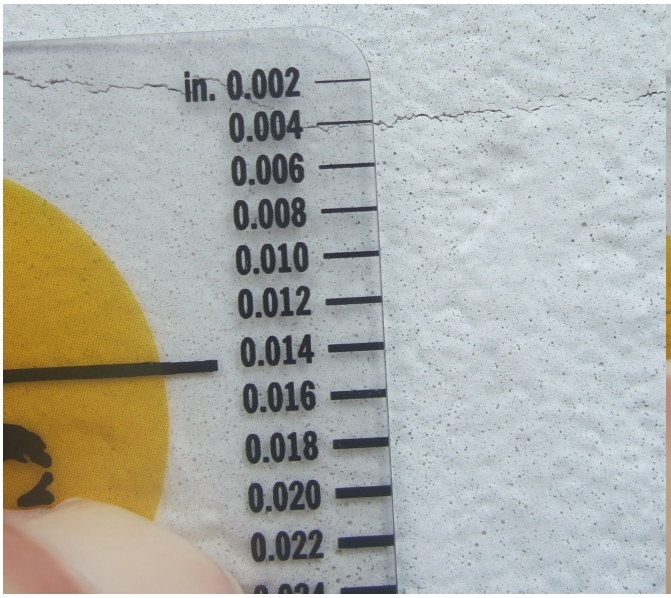
Larger cracks (0.040 and larger) may need repair with an elastomeric putty prior to touching up with the overcoat.

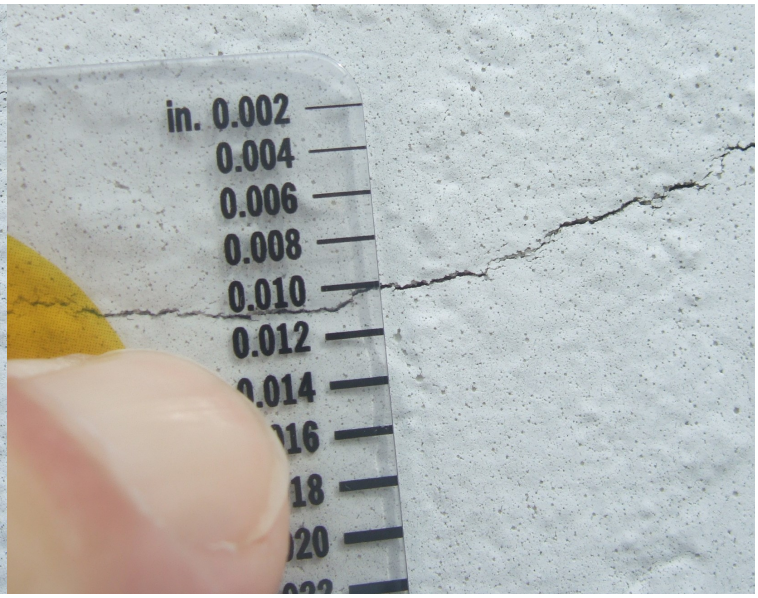
Larger crack repair usually involves working the smooth putty compound into the crack with a plastic putty knife and then "rolling" over the repair with a close nap dry finger roller.

EXEMPLARY PHOTOS CONTINUED ON NEXT PAGE...

“Hairline” crack - no maintenance required (although it could be coated over)

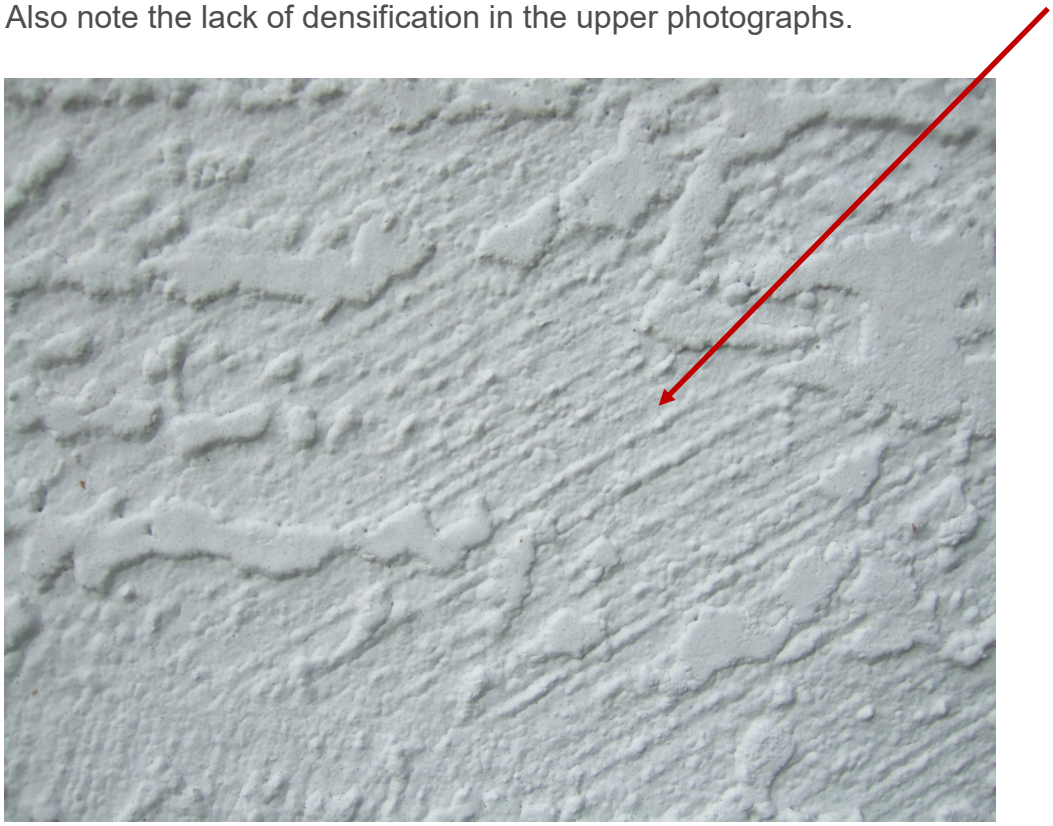
Crack in need of fresh overcoat (simple touchup reapplication of coating)





Close up of proper application of wall coating. No cracks, minimal pinholes and adequate mil thickness. Note “swirl” like marks behind texture. These indicate proper densification of the base coat (using a green handled float to recharge water and densify during initial hydration) during original application. Also note the lack of densification in the upper photographs.

Face Barrier Systems



MYTH

THE ASTM C926 (STUCCO) AND C1063 (LATH)

#16

Corner Beads are to be secured with fasteners spaced 7" o/c on EACH side of the bead and they are required when lathing over framed wall construction.

CONTINUED ON NEXT PAGE,

SEE DRAWINGS NEXT PAGE…

TRUTH

Yes / No

YES / NO, The ASTM C1063 states:

7.4.2.1 "Attach lathing accessory attachment flanges to substrate to ensure proper alignment during application of cement plaster. Secure lathing accessory attachment flanges at 7 in. (178 mm) maximum intervals along framing members".

Note this says FLANGES (plural), as it pertains to differing accessories. It does not say "secure the lath accessory flanges at 7" on center and at each side of a corner bead's flanges or secure at all separate flanges...." See examples next page.

So,
YES, if the accessory has a flange (See figure C-1 and C-2 on next page).

But,
NO, that does not mean the requirement applies to each side of the corner bead separately. A corner bead has two "wings", but it is ONE flange separated by a ground (bead). Just like a casing stop is separated by its ground and capture flange, or an expanded flange casing bead has two flanges.

A corner bead is one unit, not two separate detachable or separate flanges serving separate items. Besides unnecessary - over fastening of corner bead flanges can twist the bead and makes installation more difficult.

Remember, the purpose of accessory attachment is to provide for minimum stabilization during the application of the cement plaster. Once its flanges are embedded and the fresh cement cures, attachments become non functional. Continued….

#16 - CONTINUED...

Note than the corner bead example below has its flange attached 7” o/c. This is a single flange accessory formed at a 90 degree angle at its ground.

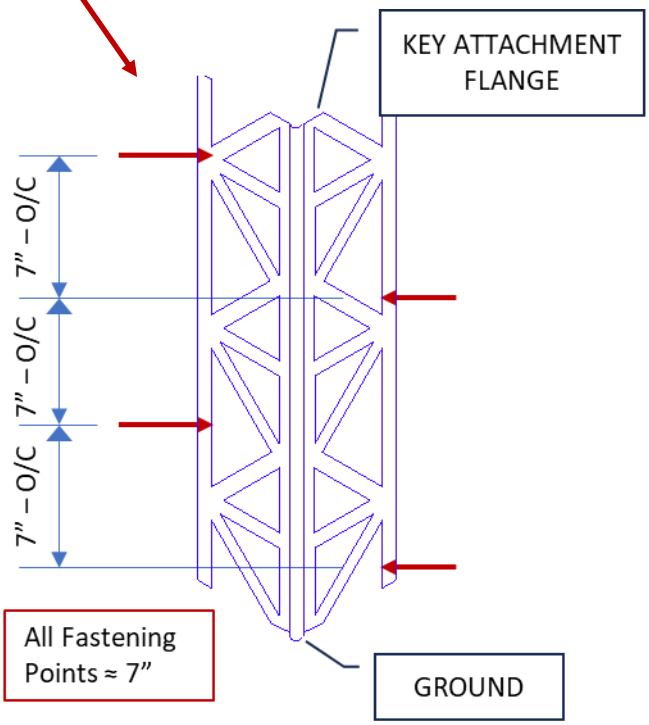


Figure C-1

EXTERNAL CORNER REINFORCEMENT

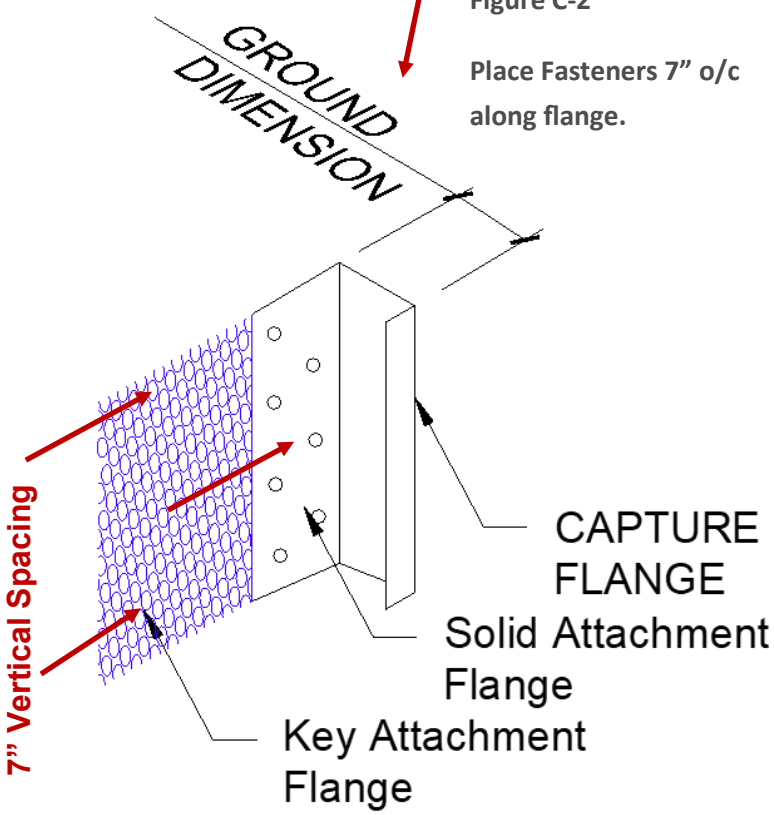
Drawings are NOT to SCALE

No, Corner Beads are not required over any wall construction whatsoever. The preferred method by traditional plasters is not to use them at all (especially on residential work) - preferring to wrap the lath around the wall corners and manually “Rod” the corner thereby creating solid cement corners with no voids or gaps. This applies to direct bond applications as well.

Note than the example below has two flange sections, but it does NOT require two rows of fasteners 7” o/c. This should provide context as to the requirement’s application.

Figure C-2

Place Fasteners 7” o/c along flange.



Expanded Flange Casing Stop

MYTH

THE ASTM C926 (STUCCO) AND C1063 (LATH)

#17
Horizontal lath laps must be wire tied between vertical framing members at intervals not exceeding 9 inches..

SEE DRAWINGS NEXT PAGE...

TRUTH

Yes / **No**

Yes, The Standards are "Application Standards" written by experienced plasters to be used (and understood) in real time by experienced plasters in the field . The standards were developed (and are still predominately used throughout Climate Zones 3-6) for application over open framing (or covered with non-structural sheathing such as asphalt impregnated sheathing or 1/4" Styrofoam). The system uses an 1/8" cement colored final shell coat for its finish placed over its 3/8" scratch coat and cured 3/8" brown coat, collectively referred to as its "base coat". (no paint contemplated or allowed)

All plasterers understand this next precept; Without the horizontal tying, when applying your scratch coat, two specific problems arise;

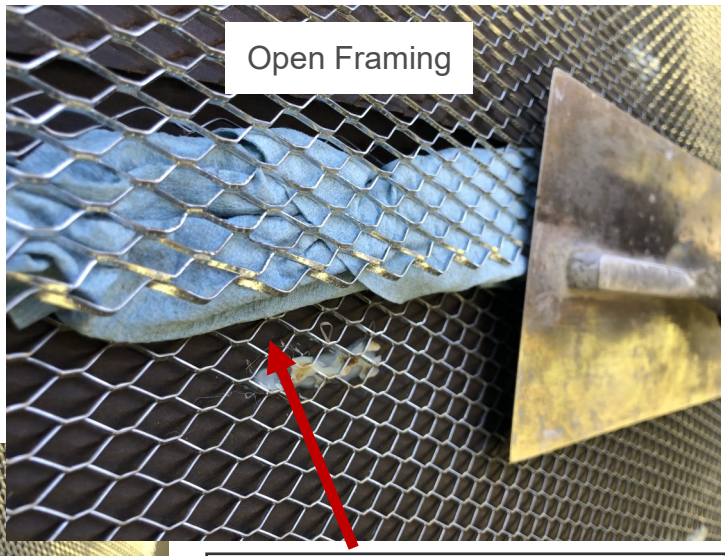
(1) Your trowel will push in-between the sheets of lath making it extremely difficult to continually apply the plaster (*see Figure T-1)* and

(2) The horizontal movement of the lath will cause a back bulge at the lap mudline causing a fracture plane and its difference of thickness will cause a horizontal bleed line through the final color coat. (*see Figure T-2)* You will not get paid!

No, If your application is over structural panels, (which are not addressed within the standard) or you are using a face barrier system (again not addressed by the standard), none of these problems will ever occur. So such tying is a solution without a problem and completely unwarranted. This is a plasterer known and is modified by the "unless otherwise specified" allowance.

#17 Continued…

Horizontal lath laps must be wire tied between vertical framing members at intervals not exceeding 9 inches..



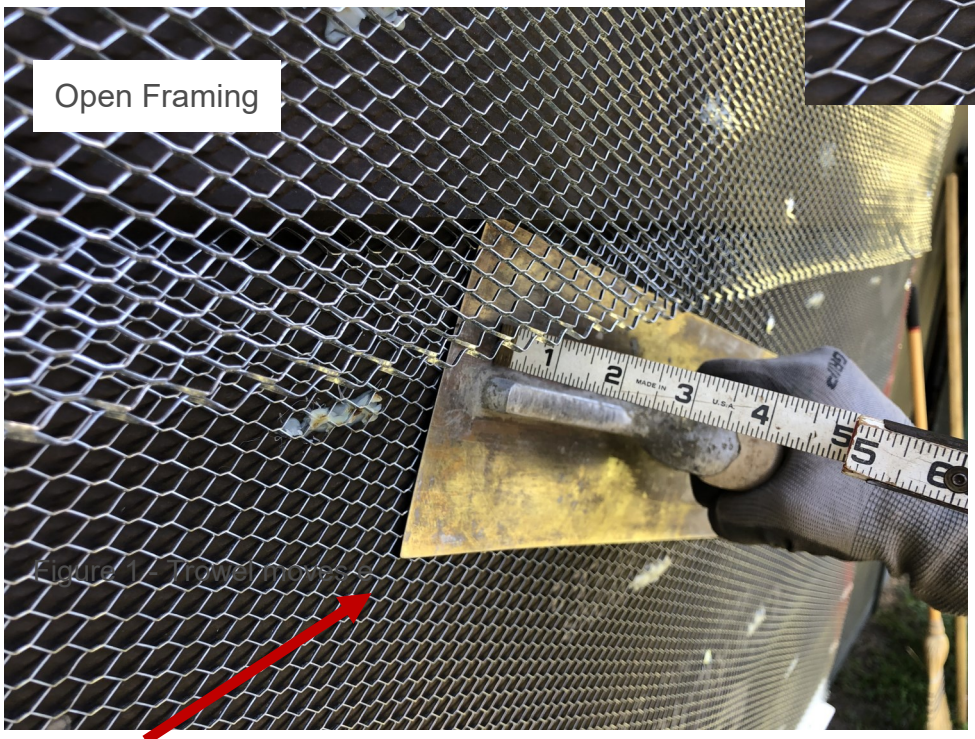


Figure T2 - Without horizontal lap tying between vertical framing members, the blue paper towel displays the amount of wet plaster that will bulge behind the upper sheet. This will create a potential fracture plane. It also will cause the color coat to cure unevenly resulting in a horizontal color bleed.

This will not happen when applied over structural panels or a face barrier system. Simply add a fastener if necessary

Figure T1 - Without horizontal lap tying between vertical framing members, the trowel EASILY pushes the lower sheet open over 1” in depth. This will cause the trowel to hang and result in a bulged lap mudline. This will not happen when applied over structural panels. Simply add a fastener if needed.

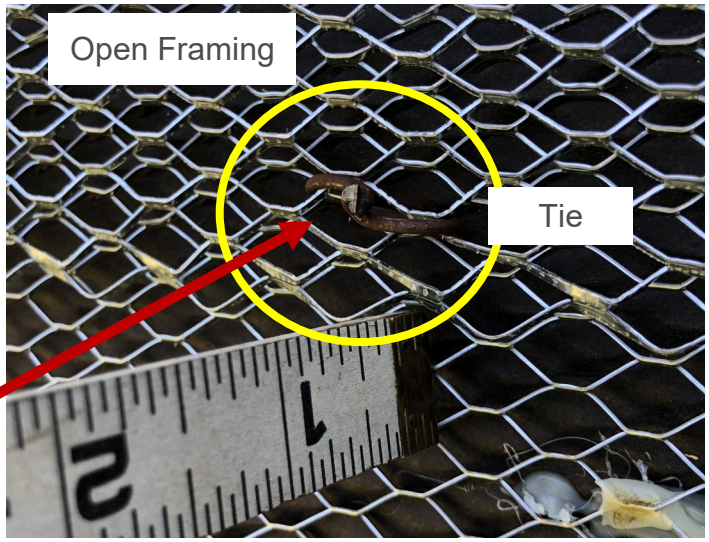


Figure T3 - With 9” horizontal lap tying between vertical framing members, the lower sheet is anchored to the upper sheet and does not move. This results in a flat plane application without “snagging” the trowel. But, not at all necessary when lath is installed over structural panels.

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