

From Texas Clay to Your Wall: How Brick Is Really Made

From the Clay Pit to the Kiln — How a Brick Gets Its Color, Its
Hardness, and Its Hundred-Year Lifespan

by Travis Nech

Champion Brick Repair — championbrickrepair.com

Champion Brick Repair — championbrickrepair.com

Copyright © 2026 by Travis Nech. All rights reserved.

This book is free. Share it with a neighbor who needs it.

Chapter 1: How Bricks Are Made — The Five Acts

Pick up a brick. It's heavy for its size, hard as stone, and it'll sit in a wall for a century without complaint. Nothing about holding it suggests it started as mud. But that's exactly what it was — dug out of the ground, mixed with water, shaped, dried, and baked at temperatures that would melt aluminum. The brick manufacturing process is one of the oldest industrial processes on earth, and the modern version is a straight line from the clay pit to your wall in five acts: dig it, grind it, shape it, dry it, fire it.

I've spent fifty years laying, repairing, and replacing brick, and I can tell you this: understanding how a brick is made changes how you think about every brick wall you'll ever own. You'll understand why the color varies from unit to unit. You'll understand why some bricks last forever and some crumble in a decade. You'll understand why matching a repair brick is genuinely hard — and why the guy who says "yeah, I can match that" without asking questions is guessing.

This book walks the whole process, from Texas clay pits to

the tunnel kiln, and then connects it back to your house: what the making of your brick tells you about repairing it. Let's start at the beginning — in the ground.

Chapter 2: Act One — The Clay Pit

Every brick starts as a hole in the ground. Brick plants are built next to their clay — the raw material is too heavy and too cheap per ton to haul far, so the pit and the plant are neighbors by necessity. In Texas, that means brick plants sit on top of Texas clay deposits: the shales and clays of North Central Texas, East Texas, and the coastal plain. Some of the biggest names in American brick dug their first pits within sight of Fort Worth.

What makes good brick clay? It's not just "dirt." Brick earth is a specific recipe that nature mixed over millions of years, and it has four main ingredients that matter:

- **Alumina** — the plastic ingredient. It's what makes clay moldable, what lets it hold a shape. Good brick earth runs roughly a fifth to a third alumina. Too much and the brick cracks in drying and fires too hard; too little and the clay won't hold together.
- **Silica** — the skeleton. About half the mix. Silica keeps the brick from shrinking, warping, and cracking as it dries and fires. It's what gives the finished brick its

shape-holding backbone.

- **Lime** — a small percentage, and it has to be finely distributed. Lime helps the silica fuse during firing, which binds the brick together. But lime is fussy: a single pinhead-sized lump of lime in the clay will pop and flake the face of the finished brick when it hydrates later. Brick plants grind their clay fine partly to make sure the lime is powder, not pebbles.
- **Iron oxide** — the color and the strength. A few percent iron gives brick its red color in the kiln, and it helps fuse the body, adding hardness and durability. We'll spend a whole chapter on iron later, because it's the reason your brick is the color it is.

The plant doesn't just dig and use. Clay is tested — for plasticity, for shrinkage, for the chemistry above — and different pits, even different layers of the same pit, get blended to hit the target recipe. A brick plant is part mine, part kitchen: the raw ingredient varies, and the plant's job is to make every batch come out consistent.

Some plants also let their clay weather — piled in the open for months, exposed to rain, frost, and sun. Weathering breaks down the clay structure, improves plasticity, and

leaches out some soluble salts that would otherwise cause trouble later. It's an old practice, and the plants that still do it swear by it. Time, it turns out, is an ingredient.

Chapter 3: Act Two — Grinding and Mixing

Dug clay is lumpy, inconsistent stuff — full of stones, roots, hard nodules, and soft spots. Before it can become a brick, it has to be made uniform. This is the grinding stage, and it's more important than it sounds: every impurity left in the clay becomes a flaw in the brick.

The clay goes through crushers and grinding mills — historically edge-runner mills with heavy wheels rolling in a pan, today more often hammer mills and roller crushers — that reduce it to a fine, even particle size. Screens filter out anything too coarse. Remember the lime problem from the last chapter: this is where it gets solved. Grind fine enough, and the lime is powder. Leave it coarse, and every pebble becomes a future pop in somebody's wall.

Then comes water. The ground clay is mixed with water to the right consistency for the forming method — and the amount of water is one of the big forks in the road:

- **Stiff-mud (extrusion)** uses the least water — just enough to make the clay plastic under pressure, roughly 12 to 15 percent.

- **Soft-mud (molding)** uses more — 20 to 30 percent — because the clay has to flow into molds.
- **Dry-press** uses the least of all — up to about 10 percent — and forms the brick by sheer pressure in steel molds.

The water content at this stage decides almost everything downstream: how the brick is formed, how long it takes to dry, how much it shrinks, and something about the final texture. Wetter forming means a more textured, handmade-looking brick — and a longer, more careful drying stage, because all that water has to come back out before firing.

Modern plants also de-air the clay — pulling a vacuum on it to remove trapped air bubbles. Air pockets in the clay become weak spots and laminations in the brick. It's an invisible step, but it's part of why modern brick is so consistent: the old handmade bricks had air in them, and some of the odd failures you see in century-old walls trace back to a bubble that was in the clay in 1910.

Chapter 4: Act Three — Shaping

Now the clay becomes a brick — or rather, a "green" brick: the right shape, the wrong hardness, still full of water. There are three ways to shape it, and you've met all three in the grades-and-types book. Here's the factory view:

Stiff extrusion is the modern standard. The de-aired clay is forced by a giant auger through a die — a shaped opening the size and profile of the brick — emerging as a continuous column. Wires slice the column into individual units at high speed. It's fast, it's uniform, and it produces the crisp, sharp-edged brick that covers most Texas houses. After cutting, the faces can be textured — wire-scratched, sanded, rolled, imprinted — which is where the surface variety comes from. One clay column, dozens of looks, just by changing what happens after the wires.

Soft-mud molding is the old way, still running in plants that make the handmade-look brick. The wetter clay is pressed into sand-coated molds — the sand keeps it from sticking and gives the brick its characteristic sanded face with little creases and folds. Originally done by hand, a man to a mold,

thousands of times a day; now done by machines that mimic the hand process. Every unit is slightly different, which is the point — the variation is the product.

Dry pressing rams low-moisture clay into steel molds under enormous pressure — hundreds to over a thousand pounds per square inch. It's used for clays that aren't plastic enough for the other methods, and it makes a dense, sharp, precise brick.

Whichever method, the green brick is fragile at this stage — firm enough to handle, soft enough to dent with a fingernail. It goes from the forming line to the dryers on cars or pallets, and the clock starts: every hour it sits wet is an hour it can warp, crack, or grow mold. The plant moves it quickly and carefully, because a green brick dropped or stacked wrong is scrap before it's ever fired.

Chapter 5: Act Four — Drying

This is the step nobody romanticizes, and it's where more bricks are ruined than anywhere except the kiln. A green brick is 7 to 30 percent water by weight, depending on how it was formed — soft-mud the wettest, dry-press the driest. Every bit of that water has to come out before firing. If it doesn't, the water turns to steam in the kiln, and steam inside a brick is a small bomb: the brick explodes, spalls, or cracks.

Drying happens in chambers or tunnel dryers at controlled temperatures — roughly 100 to 400 degrees Fahrenheit — over 24 to 48 hours in a modern plant. (The old brickyards air-dried in open sheds for weeks.) The control matters enormously: dry too fast and the outside shrinks while the inside is still wet, which cracks the brick. Dry too slow and you're wasting fuel and factory time. The plant balances heat and humidity like a baker proofing bread — and the brick shrinks as it dries, typically 2 to 4 percent, which the plant has already accounted for in the die size. Your modular brick was cut oversize as greenware and shrank into spec in the dryer.

Here's the homeowner's takeaway from the drying stage: **shrinkage is designed in.** The brick on your wall is the size it is because the plant knew exactly how much it would shrink in drying and again in firing. When you're matching brick for a repair, you're matching a product of that whole controlled process — which is why "close enough" from a different plant often isn't. Different clay, different shrinkage, slightly different final size. The courses don't line up. Measure, don't assume.

Chapter 6: Act Five — The Kiln

The kiln is where mud becomes brick — where chemistry does the irreversible work. Dried green brick goes in soft enough to scratch; it comes out as ceramic, hard enough to build a city on. The transformation happens in stages as the temperature climbs, and each stage does something specific:

1. **Final drying** — the last free water steams off as the kiln warms up. Any brick that wasn't fully dried meets its end here.
2. **Dehydration** — around 300 to 1,000 degrees Fahrenheit, the clay minerals themselves give up their chemically bound water. This is a point of no return: after dehydration, the clay can never be plastic again. The brick is committed.
3. **Oxidation** — roughly 1,000 to 1,800 degrees, carbon and sulfur compounds burn out of the clay. This is also where much of the color develops — the iron in the clay oxidizing into its red form.
4. **Vitrification** — the main event, around 1,600 to 2,400 degrees Fahrenheit. The particles in the clay begin to fuse — to melt together at their contact points, forming

glass-like bonds. Vitrification is what makes brick hard, dense, and weather-resistant. More vitrification means less porosity, less water absorption, higher strength — and it's the physical basis of the SW/MW/NW grades. A Grade SW brick is simply a more fully vitrified brick than a Grade MW from the same clay.

5. **Flashing** — an optional final step where the kiln atmosphere is deliberately changed (reducing instead of oxidizing) to darken faces and create color variation — those dark flashes across the brick that give it character.

Then cooling — controlled, over hours — because a brick cooled too fast can crack from thermal shock just as surely as a glass dish plunged into cold water.

The modern kiln is a tunnel: brick cars roll in one end and out the other over 10 to 40 hours, passing through each temperature zone in sequence. It's continuous, efficient, and precisely controlled. The old kilns — the beehive and ring kilns you see in historic photos — fired in batches over days, with the fire literally traveling around the kiln. The tunnel kiln is better in every measurable way. But here's a romantic

truth: some of the most beautiful brick ever made came out of those old batch kilns, precisely because the control was imperfect — hot spots and cool spots, oxidizing here and reducing there, every brick a slightly different record of where it sat in the fire. That variation is what modern plants work to recreate with flashing and texturing. The old kilns did it by accident.

Fuel, by the way, is mostly natural gas in modern American plants, with some using coal, sawdust, or even methane captured from landfills. The fuel matters less than the control — what counts is hitting the temperature profile the clay needs, hour after hour, batch after batch.

Chapter 7: After the Fire — Sorting, Grading, and the Cube

The brick comes out of the kiln hard, but it's not done yet. What happens next is quality control — and it's the reason you can trust the brick at the yard.

De-hacking. The fired brick is unloaded from the kiln cars — "de-hacked" in plant language — and this is where human eyes do what machines can't. Every brick is looked at. Units that cracked in firing, warped in drying, or came out underfired get pulled. In a modern plant, this sorting is fast and practiced: the sorters know the difference between a cosmetic flash variation (fine — that's character) and a structural flaw (scrap).

Grading. The sorted brick is graded against the standards — the SW/MW grades, the dimensional tolerances, the appearance categories. Remember, grade is largely set in the kiln, but it's confirmed here: absorption testing on samples verifies that the run actually hit its grade. A plant doesn't just claim SW — it tests for it. This is the unglamorous backbone of the whole system: the reason a Grade SW stamp means

something is that somebody boiled five bricks and weighed them.

Packaging. The graded brick is stacked into strapped cubes — those familiar pallets of brick you see at the yard — often by robots in modern plants. The cube is the unit of the trade: ordered by the cube, delivered by the cube, counted by the thousand. A standard cube holds around five hundred brick, depending on size. When your mason orders "two cube of modular," this is what shows up.

The guarantee. And then the brick ships with something no other common building material offers so boldly: the manufacturer's word. Acme's 100-year limited guarantee is the famous one — a century-long promise on a fired clay product. Think about what that promise implies about the manufacturing process. Nobody guarantees something for a hundred years unless the process is under control: the clay tested, the grinding fine, the drying careful, the firing complete. The guarantee isn't marketing. It's the plant telling you, in writing, that it trusts its kiln.

For the homeowner, the after-the-fire story has one practical moral: **buy from the cube, not the pile.** Brick that's been sitting loose in a yard — weathered, handled, mixed with

other batches — has lost its traceability. Brick in strapped cubes from the plant carries its identity: manufacturer, product, batch. When matching matters, the cube is the source of truth.

Chapter 8: The Brickyards That Built Texas

— Before the Tunnel Kiln

Everything in this book so far describes the modern plant. But Texas was building with brick long before the tunnel kiln arrived, and the old brickyards are worth knowing about — because their brick is still in Texas walls, and understanding how it was made explains how it behaves.

The old Texas brickyard was a simpler operation: a clay pit, a hand-molding shed, drying sheds open to the air, and a kiln — often a beehive kiln, a round brick dome that fired one batch at a time over days. A molder could hand-throw thousands of bricks a day into sand-coated wooden molds. The green brick air-dried for weeks, weather permitting. Then it was set — stacked by hand inside the kiln in careful patterns that let the fire move through — and fired with wood or coal for the better part of a week. Then it cooled for days more. Start to finish, a batch could take a month.

The firing was uneven by modern standards, and that unevenness is written into every old wall. Bricks near the fire got hot — fully vitrified, hard, dark. Bricks at the edges stayed

cooler — softer, more porous, lighter in color. The brickyard sorted them by where they'd sat in the kiln: the hard ones for exposed work, the soft ones for interior or backup. Sometimes the sorting was careful. Sometimes it wasn't — and that's why a 1910 wall can have one brick crumbling while its neighbor is perfect. Same clay, same kiln, different seat in the fire.

The old yards also worked whatever clay was at hand, with less testing and blending than a modern plant. Local clay meant local color — which is why historic Texas towns have their own brick palette, distinct from the next town over. When preservationists talk about a region's "historic brick character," they're talking about the old pits: the particular iron in that particular clay, fired in that particular kiln.

Most of those yards are gone — consolidated into the big regional plants or closed as the industry modernized through the twentieth century. But their product is everywhere: in the bungalows, the downtown storefronts, the old schools. When you repair one of those walls, you're working with brick made by hand, dried by weather, and fired by judgment. Treat it with the respect its making earned: soft mortar, gentle methods, and matching units that understand what

they are.

Chapter 9: How a Brick Gets Its Color

Ask a homeowner what color their brick is and you'll get "red" or "tan" or "brown." Ask a brick plant and you'll get chemistry. Brick color comes from three things interacting: **what's in the clay, how hot it gets, and what the kiln atmosphere is doing.**

Iron is the red-maker. Iron oxide in the clay — even a few percent — burns red in an oxidizing kiln atmosphere (plenty of oxygen). More iron, or higher temperature, pushes the red darker — from salmon pink at the low end through classic red to deep dark red and maroon. Starve the kiln of oxygen (a reducing atmosphere) and the same iron goes dark brown or nearly black. This is the single most important color fact in brickmaking: **the same clay can fire red or black depending on the air in the kiln.**

Lime makes buff and yellow. Clay with significant lime content fires to buff, tan, and yellow tones instead of red — the lime interferes with the iron's red-forming chemistry. Those cream and yellow bricks on Texas homes aren't painted or coated; they're high-lime clays doing what high-

lime clays do.

Manganese goes brown and black. Added manganese, or manganese naturally in the clay, produces brown through black tones — the dark ironspot and manganese-spotted bricks that are popular as accents.

Temperature darkens everything. For a given clay, hotter firing means darker color — the iron chemistry deepens with heat. This is why brick from the hot spots of a kiln runs darker than brick from the cooler zones, and it's a big source of the natural variation within a single batch.

Flashing is controlled drama. Those dark streaks and patches across the face of the brick — the "flashed" look — come from deliberately reducing the kiln atmosphere at the end of the firing, or from stacking the brick so some faces see flame and others don't. It's the plant imitating what the old kilns did by accident, and it's done on purpose because people love the look.

Coatings and engobes. Some brick gets a surface treatment before firing — a thin slurry coating (an engobe) that fires into a colored skin. This is how you get some of the white, gray, and specialty colors: the color is on the surface, not

through the body. It matters for repair matching (Chapter 7 of the grades book): a coated brick can't be matched by a through-body brick, because the color behaves differently as it weathers.

So when you look at your wall and see the range — the light ones, the dark ones, the flashed ones — you're looking at a map of the kiln. Every unit is a record of its clay chemistry, its temperature, and its air. That's why matching is genuinely skilled work: you're not matching "red brick," you're matching one specific intersection of clay, heat, and atmosphere.

Chapter 10: How a Brick Gets Its Hardness — and Its Lifespan

Color gets the attention, but hardness is what keeps the wall standing. And hardness, like color, is made in the kiln — specifically in vitrification.

Remember the grades from the last book: SW, MW, NW. Those grades are a measure of how completely the brick vitrified — how thoroughly its particles fused into a dense, low-porosity ceramic. More heat, more time at heat, more complete vitrification: lower water absorption, higher freeze-thaw resistance, longer life. The 17-percent absorption limit for Grade SW versus 22 percent for MW is just a way of measuring how far the vitrification went.

This is why **underfired brick fails**. A brick that didn't get hot enough — or didn't stay hot long enough — is under-vitrified: more porous, thirstier, weaker. In the old batch kilns, the bricks at the cool edges of the fire were routinely underfired, and those are the units that spall first in old walls — the odd brick crumbling in an otherwise sound expanse. It wasn't a bad wall; it was a cool corner of the kiln, a hundred years

ago.

It's also why **the same plant can make different grades from the same clay**. Grade isn't mostly about the raw material — it's about the firing. Run the kiln hotter and longer, you get SW. Run it cooler, you get MW. The clay is the same; the heat is the difference. (This is also why you can't judge a brick's grade by looking at it — the difference between SW and MW is inside the ceramic structure, measurable by absorption testing, not visible to the eye.)

For the homeowner, the hardness story has two practical endings:

First, **your modern brick is almost certainly well-fired**. Modern tunnel kilns with precise control don't produce much underfired brick — the process is too consistent. When modern brick spalls, look for water and exposure causes, not manufacturing defects. The brick did its part; something in the wall's life didn't.

Second, **old brick is variable, and you should respect that**. A wall of 1920s brick contains units fired across a range of temperatures in a batch kiln — some fully vitrified, some not. The soft ones need soft mortar and gentle handling. When

you test a wall's hardness with the scratch test, you're sampling that century-old variation. Test several bricks, not one — and spec the repair for the softest ones you find, not the hardest.

Chapter 11: The Texas Brick Story — An Industry Built on Texas Clay

Texas doesn't just use brick — Texas makes it, and has for well over a century. The industry here is worth knowing about, because the brick on your house very likely came from Texas clay, fired in a Texas kiln, by people who've been doing it for generations.

The flagship story is Acme Brick. Founded in 1891 — as the Acme Pressed Brick Company — by George Bennett, who found his clay along a Brazos River tributary about forty miles west of Fort Worth, near what's now Millsap in Parker County. Bennett bet on industrial-scale machinery when Texas brickmaking was still largely a hand craft, and the bet paid off: Acme grew into the largest American-owned brick manufacturer in the country — roughly one out of every four bricks sold in America comes from Acme — operating plants across the central and southeastern US, with seven brick plants in Texas alone. Since 2000 it's been part of Berkshire Hathaway. Its headquarters is still in Fort Worth, a few miles from where the clay pits started it all. Acme was also the first

brickmaker to put a 100-year limited guarantee behind its brick — a century-long promise, which tells you something about what the company thinks of its own firing.

But Acme isn't the whole story. Texas has hosted dozens of regional brick plants over the decades — in Denton, Elgin, Malakoff, Ferris, Garrison, and more — each working its local clay, each producing brick with its own character from its own pit. Some are gone now, their plants closed and their pits filled in. Their brick lives on in the walls of Texas houses, which is why matching old brick sometimes becomes archaeology: identifying a plant that closed in 1970 from the stamp in a frog, and hunting its surviving stock in salvage yards.

The Texas clay itself deserves a word. North Central Texas shales fire to the reds and oranges that define so much Texas architecture. East Texas clays run their own range. The buff and tan bricks — the ones that look like they belong in the Hill Country — come from the higher-lime clays. When you drive across Texas and watch the brick colors change town by town, you're watching the geology change. The houses are literally made of the ground they stand on.

Chapter 12: Why the Making Matters for Repairs

Here's where the factory tour pays off — back at your wall, with a repair to plan. Everything in the manufacturing process leaves fingerprints, and reading those fingerprints is what separates a repair that disappears from a repair that fails.

Batch variation is real and unavoidable. Brick is made in kiln runs, and no two runs are identical — the clay blend shifts, the temperature profile drifts, the atmosphere varies. That's why the grades book told you to buy 10 to 20 percent extra from the same batch and keep the spares. It's not fussiness; it's physics. A replacement brick from a different batch is a different brick, even with the same product name on the box.

Underfired units hide in old walls. When you're replacing spalled brick in a pre-1960s wall, the units around the repair may include soft, underfired originals. Set hard modern replacements among them and you've created a wall of mixed hardness — which means mixed movement, mixed

water absorption, and a patch that ages differently from its neighbors. On old walls, match soft with soft: reclaimed brick of the same era, set in lime mortar.

The color is the last thing to match — because it's the most complex. After this book, you know why: the color is clay chemistry plus temperature plus atmosphere plus position in the kiln. Matching it means matching all of that, approximately, by eye. It's genuinely skilled work, and it's why a good brick yard employs people who do nothing but match. Respect the difficulty: if matching were easy, every patch would be invisible, and they're not.

Manufacturing defects are rare in modern brick — so don't blame the brick. When a twenty-year-old modern brick wall has problems, the cause is almost never "bad brick." It's water (flashing, gutters, sprinklers, grading), it's mortar age, it's the wrong repair by a previous hand. The brick came out of a tunnel kiln with precise control and a 100-year guarantee behind it. Believe the guarantee. Fix the water.

And the reverse: believe the evidence on old brick. When a 1920s wall shows widespread spalling of the units themselves — not the mortar, the brick — that's the

manufacturing talking: soft-fired, high-absorption units meeting a century of Texas weather. Those walls need the gentle approach: soft mortar, careful water management, selective replacement with matching-soft units. You can't make a 1920s soft-mud wall behave like a 1990s extruded veneer, and trying — with hard mortar and aggressive methods — destroys it.

The brick on your wall is a manufactured product with a birth certificate written in clay, heat, and air. Read the certificate, and the repair plans itself.

Chapter 13: Questions Homeowners Ask Me About How Brick Is Made

Is brick environmentally friendly? More than most building materials, by the measure that matters: lifespan. Firing brick takes real energy — kilns run for days at thousands of degrees. But a brick wall lasts a century or more with minimal maintenance, which amortizes that energy over generations. The industry has also gotten cleaner: modern tunnel kilns are far more efficient than the old batch kilns, plants recycle heat, and some fire with landfill methane or sawdust. The greenest building material is the one you never have to replace.

Why do bricks have holes in them? The cores lighten the brick (less clay, less fuel to fire it, easier to handle), give mortar more surface to grip, and in some designs allow reinforcing steel. They're also a fingerprint of the extrusion die — the die forms the holes as the column comes through. Solid brick without holes is the classic residential face unit; cored brick is common in structural work.

What's the white stuff on new brick? Usually efflorescence

— soluble salts from the clay and mortar migrating out as the new wall dries. It's common on new construction and typically fades within the first year or two of weather. Persistent efflorescence after that points to a water source, not a manufacturing problem.

Can brick be recycled? Absolutely — and it is, constantly. Reclaimed brick from demolitions is a real market: cleaned, sorted, and resold for repairs and new work where the old look is wanted. Brick can also be crushed for aggregate. A brick's life doesn't have to end when its first wall comes down.

Why does my brick look different when it's wet? Water fills the surface pores and changes how light reflects — every porous material darkens when wet. It's also a useful diagnostic: watch how your wall dries after rain. Areas that stay dark long after the rest has dried are holding water — and holding water is the beginning of every brick problem there is.

How hot does the kiln actually get? Hot enough to melt aluminum several times over — vitrification happens around 1,600 to 2,400 degrees Fahrenheit, depending on the clay. For reference, lava runs about 1,300 to 2,200. Your brick was

fired at lava temperatures. That's why it lasts.

Do they still make brick by hand? Machine-molded "handmade-look" brick, yes — widely. Literally hand-thrown brick, essentially no, outside of artisan and restoration work. The machines won a century ago on consistency and cost, and modern buyers mostly want the look without the variation. What the machines can't quite replicate is the deep irregularity of true hand work — which is why genuine handmade antique brick commands a premium in the salvage market.

If brick lasts 100 years, why does mortar only last 25? Because they're designed for different jobs. The brick is the armor — hard, dense, permanent. The mortar is the gasket — softer, sacrificial, meant to yield so the brick doesn't crack. A wall where the mortar outlasts the brick would be a wall of cracked brick. The system works because the mortar gives. Repointing every few decades isn't a failure of the system — it is the system.

Does the plant test every batch? Plants test regularly — absorption, strength, dimensions — on samples pulled from production. They don't test every brick, but the process control (consistent clay, consistent temperature profile)

means the samples represent the run. When a plant stamps a grade on a product, there's test data behind it.

Why do some bricks ring when you tap them and others thud? The ring is density talking. A well-vitrified brick is dense and glass-bonded inside — tap two together and they ring like a bell. An underfired or soft brick is more porous and less bonded — it thuds. Masons have used the ring test as a field check for generations: it's not a lab measurement, but a brick that rings is a brick that fired well.

What's the difference between shale and clay for brickmaking? Shale is clay that's been compressed into rock over geologic time — harder raw material, but it grinds down into the same working clay. Many modern plants use shale because it's consistent and abundant. For the finished brick, what matters is the chemistry and the firing, not whether the raw material started as soft clay or hard shale.

Can you make brick without firing it? Yes — adobe and unfired earth blocks are some of humanity's oldest building materials, and they're still used in dry climates. But unfired brick dissolves back toward mud when it stays wet, which is why fired brick took over wherever rain falls. Firing is what makes brick permanent. An unfired "brick" in Texas weather

wouldn't survive a single spring.

Why is matching old brick so hard if plants keep records?

Records help when the plant still exists and the product line is still running. But product lines get discontinued, plants close, clay pits play out and the replacement pit fires a different color. And even with perfect records, the kiln atmosphere on any given day in 1962 isn't in the file. Matching old brick is part science, part art, and part salvage-yard luck — which is exactly why you buy extra from the same batch when the brick is new.

A Short Glossary of the Brickyard

Keep these ten terms and you'll follow any conversation at the brick yard — and you'll know more about your walls than most people who sell brick for a living.

- **Green brick** — a formed, unfired brick. Still soft, still full of water.
- **Vitrification** — the fusing of clay particles in the kiln's heat. The source of hardness.
- **Flashing** — dark color variation from a reducing kiln atmosphere. Intentional character.
- **Frog** — the indent in the brick's face that keys the

mortar.

- **Engobe** — a surface coating applied before firing for color.
- **De-hacking** — unloading fired brick from the kiln cars.
- **Batch kiln** — fires one load at a time (beehive, ring kilns). The old way.
- **Tunnel kiln** — brick moves continuously through temperature zones. The modern way.
- **Oxidizing atmosphere** — plenty of oxygen in the kiln. Iron fires red.
- **Reducing atmosphere** — starved of oxygen. Iron fires dark brown to black.

A Final Word

You started this book holding a brick. Now you know what you're holding: Texas clay — alumina, silica, lime, iron — dug from a pit, ground fine, mixed with water, shaped by auger or mold, dried with care, and fired at lava temperatures until its particles fused into ceramic. You know where its color came from — the iron in the clay, the heat of the kiln, the air in the fire. You know where its hardness came from —

vitrification, complete or incomplete. And you know why it matters: because every repair decision — what brick, what mortar, what method — is really a decision about honoring how that brick was made.

The next time you look at your walls, you'll see the kiln in them. The variation from unit to unit, the flashed faces, the stamp in the frog — it's all there, the whole manufacturing story, written in clay and fire. A hundred years from now, somebody will read your walls the same way. Make sure they read a wall that was repaired right.

For the rest of the free library — costs, maintenance, grades and types, hiring — visit [Travis Nech's Free Book Library](<https://metro-foundation-repair.web.app/free-books/>). The [Brick Industry Association](<https://www.gobrick.com>) publishes the technical background on everything from clay chemistry to kiln practice. And when your walls need hands with real [brick expertise](<https://championbrickrepair.com>) — people who know what the brick is made of before they touch it — that's what we do.

About the Author

Travis Nech has spent 50 years in Texas brick, masonry, and foundation work. He owns [Champion Brick Repair](<https://championbrickrepair.com>) — (817) 900-6324 — [Metro

Foundation Repair](<https://metrofoundationrepair.com>) — (817) 670-4474 — and the [LintelLOCK](<https://lintlerepair.com>) lintel system — (469) 730-0650. All his books are free at [Travis Nech's Free Book Library](<https://metro-foundation-repair.web.app/free-books/>).