



Little guide to

TADEIAKT



Tadelakt refers to a specific technique, a process of Moroccan origin that, through the use of specific methods and treatments, gives the finish a smooth appearance and *waterproof* properties, making it particularly suitable for *continuous surfaces* and bathroom areas.

Tadelakt is obtained by applying specific processes and treatments to a mixture of **natural materials**.

A hydraulic lime base is mixed with aggregates (specifically cocchiopesto), additives, pigments, and fibers.

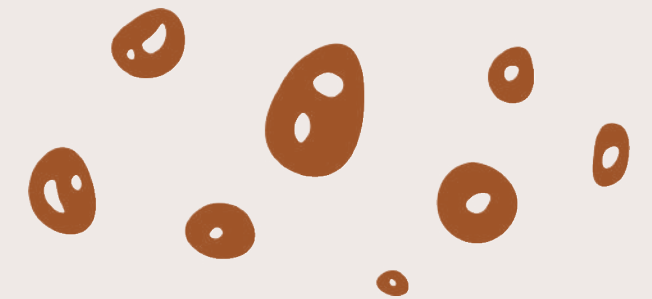




What is lime

Lime is the oldest binding agent known to man, along with raw earth.

It is a binding agent derived from **limestone**, which has a very high calcium carbonate content. It was primarily quarried from mountains or rivers — especially in the past, when water action kept it very clean (such as the lime from the Brenta) — but today it is mainly extracted from the ground.



Procedure to obtain lime:

Once quarried, the stone is fired in kilns at approximately 900°.

During firing, all the carbon dioxide and water contained in the stone are removed; as a result, the stone loses almost no volume during firing, but loses about *half* of its weight.

Lime putty

There are three types of *non-hydraulic lime*:

- **Quicklime** (directly out of the oven without ever coming into contact with water)
- **Hydrated lime powder** (hydrated with a controlled water content of 32%, which allows the stone to dissolve, but in the form of powder)
- **Slaked lime** - also known as lime putty or *Grassello*

Once fired, to make **lime putty**, the limestone is soaked in a *large amount of water*, a process that causes the stone to begin heating up (due to an exothermic reaction), then boiling, steaming, and finally *melting* until it reaches the consistency of a **cream**.

Lime putty is left to age in tanks for at least **one year**. This aging process causes the crystals in the lime putty to undergo a *transformation*.

Indeed, before aging, lime putty has *prismatic* crystals; after aging, they become *tabular*, like sheets of paper, which allows the crystals to interlock more effectively with one another during the use and application of the material.

The basic rule is that, in every mix, the lime crystals must be the *finest* — finer than any other aggregate (sand, cocchiopesto, marble dust) — because the sand must envelop the lime grains, never the other way around.



After aging, the lime putty needs carbon dioxide again to harden—a process called *carbonation*—which restores it to the stone's original composition.

Lime putty can be identified by the abbreviation CL, followed by a number—70, 80, or 90—which indicates the percentage of calcium carbonate content, or the level of purity.

CL90 lime is the purest (90% calcium carbonate).



Cement is considered one of the main causes of global pollution, precisely because the stone is fired at 1,500°, releasing a huge amount of *carbon dioxide*.

Lime putty, on the other hand, is a material with virtually zero carbon dioxide emissions, since, when fired at 900°, it releases much less carbon dioxide; furthermore, in order to harden, it needs to reabsorb carbon dioxide, so the net emissions are nearly zero.

Natural Hydraulic Lime

Natural hydraulic lime is a binder that is already hydraulic. The raw material is always limestone, but it contains fragments of clay, which in turn contains silica-alumina.

Once the stone is fired, the silica-alumina is transformed into *aluminum silicates*, which are responsible for the hydraulic setting process.

Classification of Natural Hydraulic Lime

NHL is the abbreviation used to indicate compressive strength and the temperature required for firing:

- NHL2 - fired at 1100° - less durability but more breathability
- NHL3.5
- NHL5 - fired at 1300° - excellent durability but much less breathable (similar to concrete), less flexible

Cocciopesto

To improve the hydraulicity of the mixture, an **aggregate** is added.

Some hydraulic ingredients that can be used are:

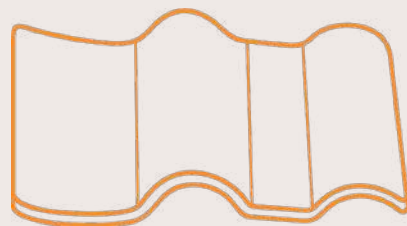
- Cocciopesto
- Pozzolan (volcanic sand)
- Pumice stone
- Zeolite
- Fossil powders (shell deposits)
- German 'trus' of meteoric origin
- Gravel fired by flowing lava
- Metakaolin (artificial)
- Slag (waste from cast iron production)
- Coal combustion waste



Cocciopesto, a type of crushed brick, is made from clay that originally contained silica-alumina, which turned into aluminum silicates once the clay was fired. Adding cocciopesto to the mixture with lime putty (which is air-hardening lime) gives the mixture hydraulic setting properties.

Cocciopesto is traditionally made from **old roof tiles** and can be red or yellow depending on the original tiles. Cocciopesto made from old roof tiles is ideal because the tiles were fired uniformly at low temperatures and were made from finer clays.

If the cocciopesto is made from modern bricks or roof tiles, these were fired at high temperatures, so this cocciopesto will not be suitable for imparting *hydraulicity* to the mixture.



It is essential to give hydraulicity to the lime in order to use it in damp environments, floors, bathrooms, and showers. Limestone itself is not soluble in water; lime, on the other hand, contains water-soluble components called free lime, which, when exposed to environmental moisture, transform into calcium sulfate—that is, gypsum.

This is why mixtures made without hydraulic aggregates do not work, and why we add cocciopesto or other pozzolanic aggregates to create a mixture that is no longer susceptible to *damage from moisture*.

To test whether a brick or roof tile is suitable for cocciopesto, simply crush it into particles as fine as 500 microns, mix it with lime putty, shape it into a small ball, and seal it in a small bag to prevent air from entering. Since it is an air-setting binder, if it does not harden in the absence of air, it means the cocciopesto is not effective; if it does harden, it means the cocciopesto provides hydraulic properties.





Additives

- Cellulose / metilcellulose
- Starches (rice / maranta or others)
- Xanthan gum
- Raw or cooked flaxseed oil
- Black soap / Marseille soap
- Sugar (which increases the solubility of lime by 100 times, thereby allowing for a reduction in the amount of water in the mixture, reducing the risk of cracks, and promoting *carbonation*)
- Animal fat
- Wine vinegar (which prevents the pulverization of the mixture)



Pigments

Lime paints always have very subtle colors because the natural pigments used can never exceed 10% (by weight), unless the work is done using the fresco technique. There are several pigments that can be used in the mixtures, including:

- Natural earths
- Ultramarine blue
- Cobalt blue
- Oxides (natural pigments that undergo some treatments)



Fibers

They are important for **preventing cracks and fissures** during shrinkage, but above all because they **retain a lot of water** in the mixture, allowing it to dry much more slowly.

- Pig bristles / horsehair
- Sisal fibers





Mix and application

In the specific case of the workshop held in Rome with master decorator Danilo Dianti, participants created—as an alternative to Tadelakt—a waterproof cocchiopesto that uses lime putty instead of powdered hydraulic lime.

Mix for the base coat



Natural hydraulic lime
NHL 2 or 3.5
0.5 parts



Lime putty
CL90
1 part



Cocchiopesto
2 parts



Sand 2mm
1 part



Sisal fiber
0,1%



Sugar
diluted in half a glass of water
0,2%



Red vinegar
1%

To check if the mixture has the right consistency, I scoop it up with the Japanese spatula and let it slide down; if it slides down too easily, it's too thin (it won't hold its shape well), and if the spatula gets too dirty, the mixture is too thick and will crack.



Mixture for the finishing coat



Lime putty

2 parts



Cocciopesto
(0,1 thickness)

1,5 parts



Fine sand

0,5 parts



Xanthan gum+
Cellulose

0,5 / 1%



Sisal fibers

0,2%



Sugar
diluted in half a glass of water

0,2%



Red vinegar

1%

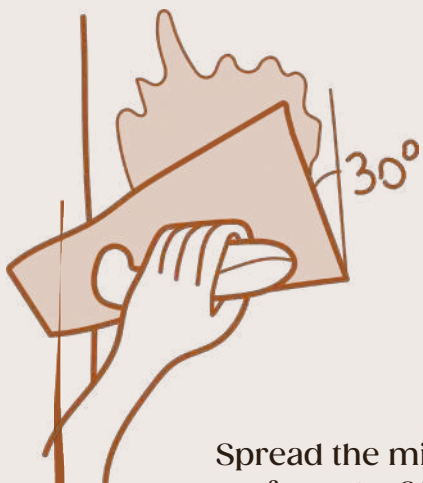


Application process

Prepare the base coat mixture.



Wet the wall with a large brush dipped in lime water (1 kg of lime in 10 liters of water).



Spread the mixture over the surface at a 30° angle using a large Japanese spatula, feeling the grains scrape against the surface, so that you spread it to the correct thickness without going over the same spot multiple times.

Wait a few minutes until you can see, against the light, that the areas where the mixture has already been spread are no longer shiny.

Run a wet wooden trowel over the surface, applying firm pressure in circular motions. This creates ridges that ensure the finishing compound adheres properly.



Run a trowel with a damp sponge over the surface.



Prepare the finishing mixture, and after moistening the base, apply it using a large Japanese trowel at a 30° angle to the wall.





Rub a flat stone over the surface using small, circular motions, keeping them very close together, so as not to leave any larger circular marks that would be visible.*

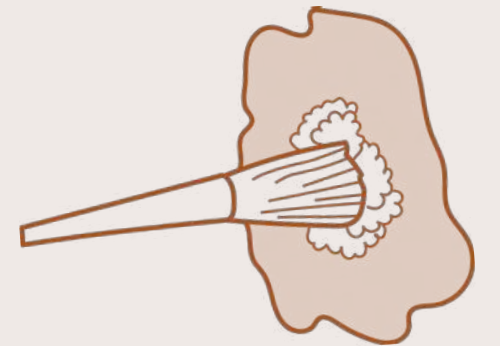
Go over it again, still at a 30° angle to the surface, using a small Japanese spatula, which allows you to apply much more pressure.

This process closes the pores more and more, causing a 'cream'/paste, made up of the finest grains to emerge**

For corners and edges, use a wet, folded plastic bag.



After about 12 hours, or at most 24 —that is, when the lime is still fresh and at its highest pH, but after it has finished absorbing moisture — prepare the soap using the following proportions: 1 part black / Marseille soap to 5 parts lukewarm water.



Spray the surface, and then apply the soap with circular motions using a brush, as if massaging it in to help it penetrate. This will cause it to foam and trigger a chemical reaction with the lime. This process also seals any tiny cracks that may form as the surface dries.

*If you notice that as the stone moves across the surface, it tends to scrape away some material, wait a few more minutes before continuing.

**You can set aside a little of the paste to fill any small holes that might form.



After about 3 to 4 weeks, prepare the first layer of wax (one liter of thinner and 100 grams of beeswax). The wax can be applied with a spatula, a sponge, or a brush, and should always be spread in very thin layers. When applied warm, the wax penetrates deeply; as it dries, the solvent evaporates, leaving the wax embedded within the surface. Once dry, the wax should be polished with a polisher or a 000-grit polishing pad, as used by furniture makers.

Apply pressure by running a ceramic stone over the surface, then go over it again with a bodywork spatula, which is also used for closed corners. To finish the open corners, however, we'll use a folded, wet plastic bag.



A few days later, prepare a second batch of wax (one liter of thinner but 200 grams of wax), adding 40 grams of carnauba wax, which has a high melting point and helps give the wax greater hardness — particularly useful for areas constantly exposed to hot water.

Any leftover wax should be stored in a sealed jar so it can be reapplied over time as part of routine maintenance.



Credits

All the information contained in this document was presented by Danilo Dianti, master decorator and leading expert in plastering techniques and natural materials — particularly lime-based ones — during the Tadelakt workshop held in Rome from June 12th to June 14th, 2026.

All the photos contained in this document were taken by Carla Procida and are property of MUL.ĠŠ.ERIN LTD

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icon “*goo*” by Sean Maldjian (Noun Project)

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icon “*organic texture pattern*” by Path Lord (Noun Project)

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icons “*organic texture pattern*” by Path Lord (Noun Project)

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icon “*clay roof tiles*” by Oleksandr Panasovskyi (Noun Project)

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