

**RECOVERY SECTOR OF
CIVIL MONUMENTAL BUILDINGS AND
GREEN BUILDING HISTORICAL-ARTISTIC RESTORATION SECTOR**

FAT LIME CREAM AT 6 MONTHS

OBTAINED IN TRADITIONAL METHODS, WITH WOOD COOKING AND AGING IN THE TANK

SECTOR BUILDING RECOVERY

MONUMENTAL

CIVIL AND GREEN BUILDING SECTOR

HISTORICAL RESTORATION

ARTISTIC

BUSINESS CONSULTANCY

RESTORER OF B.C. CLAUDIO MACRÌ CELL. 351.5959050

LEADER IN THE PRODUCTION OF THE TRADITIONAL LIME GRASSELLO CREAM OBTAINED IN THE ANCIENT AND ARTISAN METHODS, WITH LONG WOOD COOKING AND SUBSEQUENT SEASONING AND CARE IN TANK FOR SIX MONTHS. NATURAL BINDER FOR MAKING MORTARS FOR PLASTERS AND PLASTERS AND DECORATIONS ORNAMENTALS OF DECORATED SURFACES.

Air lime is the oldest binder, already used by the Phoenician civilizations and continuing up to the present day. His name derives mainly from the ability to set and harden in the air. It has no polluting effects on the environment, without be negative for housing health. It has been used in construction for thousands of years, it appears to be Natural, Ecological, Porous, Breathable, dehumidifying, thixotropic and with good adhesion to masonry, does not form soluble salts over time neither efflorescence nor water retention, resistance in harsh climates and in marine climates with excellent thermal insulation.

TRADITIONAL LIME FAT CREAM WITH LONG SWEET COOKING IN WOOD AND WITH SEASONING IN THE TANK AT 6 MONTHS

RECOVERY OF MONUMENTAL BUILDINGS CIVIL AND GREEN BUILDING.

HISTORICAL-ARTISTIC RESTORATION SECTOR

INTERNAL EXTERIOR (GP) (CR)

TRADITIONAL LIME FAT CREAM

CALCIUM LIMESTONE CL/90SPL / UNI EN 459-1

WITH (CAO+MGO) CONTENT OF 90.70%, UNI EN 459- 2

CaO CONTENT OF 88.80% UNI EN 459-2

FREE FROM IMPURITIES AND ADDITIVES OF ANY KIND.

SPECIFICATIONS OF GRASSELLO CREAM

TRADITIONAL LIME FAT

Condition: wet in 25 kg bucket/bag

State: wet mass;

state of aggregation; dense and homogeneous paste;

Product of alkaline nature, resistant to time and formation

of molds;

Hardening: calcium hydroxide, reacts with carbon dioxide

of the air, giving the typical reaction of aerial binders with formation

of calcium carbonate.

Our traditional lime slaked cream is a binder, which can be used to prepare compounds

fluid and workable, it has the property of passing into the state solid, with good amalgam viscosity in retaining the sands mixed, and strength to unite tenaciously in joints and veins building materials.

HISTORY OF MARSEGLIA CALCE SRL

Marseglia lime began its activity much earlier than the years 50, the Progenitor was Antonio Marseglia who, by virtue of his work experience acquired from a young age, he started out in a way Artisan his own business, cooking the limestone in the so-called hand kilns, i.e. heaps of stones arranged in a spiral with ring growth and rounded system. At the base of heap the fagots were inserted and, in order not to disperse the heat inside the stack, it was covered with earth from the top to descend across the surface. Such was the method used since antiquity. The precious oxide obtained from cooking of pure limestone, was sold in the Province of Brindisi and part of the Puglia Region. In the 60s by virtue of continuous growth Professional, made up of a great consensus of oxide requests, Antonio proceeded and started the new Industrial Site "Tino Villanova" and here the entrepreneurial development with the furnaces began for wood firing of limestone. In the 70s, with the building growth and the continuous requests of customers for the product finished, Antonio begins the production of slaked lime, building huge vats for maturing. In the 90s Marseglia Antonio, continuing in the prestigious growth of the clientele, obtained for the quality and care of the finished product, and renews its own innovative plant still in Tino di Villanova. Over 2,000 years the children take over, and Marseglia Calce Srl is born, continuing in the footsteps indicated by the Father, keeping all those methodologies handed down and acquired by the children in the daily work, from the production of wood cooking to the cure of the maturation in the tank, to continue producing after 72 years the excellent slaked lime of the past. One of our strengths of our company consists in offering a consultancy service (carried out by professionals and technicians in the Historic Building Sector), capable of analyzing materials pre-existing ones and in recommending the right maturing of the cream of lime putty and the aggregates needed for the mortars to realize.

PRODUCT SPECIFICATIONS AT 6 MONTHS

Marseglia Calce Srl "perhaps" is one of the very few companies which still produces the slaked cream using traditional methods traditional lime fat, obtained with the ancient methodologies and the commitment of the past, in the choice of our pure stones Apulian calcareous, gradually cooked in wood at low temperature for a good 14/15 days, in the ancient vertical flame oven indirectly, to obtain a valuable homogeneous oxide of reactive calcium, and once placed in plenty of water for the its extinction, the dense milk of lime is obtained "the hydroxide of calcium", at the end it is decanted into the tanks for its maturation, which is a good 181 days, which are necessary for the product to work use, as a binder to prepare mortars - grouts on site traditional, colored if desired, for intonachini plasters, shapes of ornamental decorations both smooth and in relief and more. It has a fine white granular structure San Giovanni, more dense buttery and homogeneous, with an excellent natural viscosity and creaminess in its softness almost greasy, its plasticity characteristics are excellent, adhesiveness, thixotropic antibacterial, therefore suitable and compatible for applications in the building recovery sector

Monumental - Civil and Green Building and Historical - Artistic Restoration. In fact, by combining our traditional lime fat putty cream aggregates and sands of various particle sizes, are obtained in construction site excellent traditional historical mortars and grouts, both for the hold of the amalgam in the application and adhesion phase to the masonry, than in the smoothness of the final draft, these results they are mostly reached by our prized putty cream traditional lime fat at 6 months.

Traditional lime putty cream at 6 months, due to its characteristic and its adequate alkalinity, in packaging the mortars (binder plus sand), can be added if desired colored earths or natural pigments to obtain the mortar colourful. With this ancient methodology, the applied mortars will keep in the long run the coloring, since the color is fixed in the binder, in the carbonation phase of setting and hardening, giving rise to form a single mass between the binder and the pigment.

The colored mortar obtained, due to its recognized fluidity qualities, viscosity, density, adherence and thixotropic, makes it usable both as a thick colored base layer (arriccio-render) and as a colored finishing body, reducing the work phases to create plasters and colored plasters, or to create/integrate silhouettes of ornamental decorations both smooth and in relief e more, jambs, frames, plinths and colored grouting etc.

The addition of water in mortars made with our binder should be avoided, since in its mass our binder has the necessary percentage of free lime water to give the mortar the right workability and plasticity and to respect the mechanical resistances, it is advisable to wet the masonry completely, even the night before.

Due to the strong sealing viscosity of the blended aggregates, neither contains the loss of mortar due to falling to the ground, composed as follows mortar achieves excellent application results.

Seasoned lime putty cream is used for millennia, once applied it gives guarantees of not generating retentions of water nor efflorescence and not form in the long term harmful by-products of soluble salts (e.g. magnesium sulfates) which would form cottony saltpeter. Our slaked cream traditional lime fat is a Natural Ecological binder, having good adherence to the masonry, in fact, with its Porous qualities, Breathable, Dehumidifying, Antifreeze, Antibacterial, these characteristics allow it to evaporate rising damp easily from the mortar, which occurs by suction by the binder with subsequent elimination by osmosis, creating a uniform control of humidity in the masonry, with good thermal insulation. Excellent resistance in cold climates (since it does not freeze) and in marine climates (it does not form saline efflorescence). It is a natural and ecological binder, not has polluting effects on the environment, without being harmful to the housing health. No need to add cements or resins in the mixing phase to obtain its natural hardening.

Good reversibility (according to the restoration charter)

SECTOR: BUILDING REFURBISHMENT

MONUMENTAL - CIVIL AND GREEN BUILDING E

HISTORICAL - ARTISTIC RESTORATION

Binder, traditional seasoned lime putty cream

at six months;

Totally Natural and Ecological, compatible with the structures

Ancient;

To be used for brick masonry, mixed with stone and brick,

substrates with mixed mortars.

DO NOT APPLY:

On chalky, inconsistent, chalky or degraded, greasy substrates or silty or with paints or synthetic films, on reinforced concrete. Protect surfaces from bad weather and pouring rain from strong solar radiation, do not apply on cold and harsh days.

SURFACE PREPARATION:

Elimination of encrusted and inconsistent parts, subsequent washing of the surfaces and brushing to give adherence to the new ones mortars.

Surfaces must be clean and well wetted to waste, even the night before and before work

USE:

For preparing / integrating Historic mortars and grouts on site both white and colored for plasters and intonachini, mortars for shape decorative ornaments both smooth and in relief, frames,

colored stucco, jambs, friezes, etc.

MIXING APPLICATION OF MORTARS:

Mix in rotary mixers, adjustable mills, and/or mixer electric, or manually until a dough is obtained homogeneous;

It is advisable to avoid adding water to the dough, as the traditional lime putty cream, has in its mass the natural free lime water. For any needs work at your discretion add a minimum amount of water in the dough.

It is recommended to apply with a metal wooden trowel and trowel or sponge, to obtain the desired finish;

TO MAKE HISTORICAL MORTARS:

The traditional lime putty cream is mixed with mixed aggregates of silica sand, white quartz silica, granite, marble, limestone, travertine, cocchiopesto, kaolin, etc. (sands igneous - sedimentary - metamorphic) always washed and sieved, without the presence of clayey materials, elements biological and various impurities, selected in the right quantities of

granulometric scales;

In the preparation of traditional lime-based mortars aerial, the ancient rules performed by the Masters always apply Artisans, eventually the water should be added gradually to the dough continuing to stir the mixture.

AIR MORTARS:

CLASSIC EXAMPLES OF THE QUANTITIES TO PACK THE MORTAR IN SITE. MALTA MEDIA AIRLINES: MEDIUM MORTAR:

In proportions:

10 kg of binder aged for 6 months;

30 kg of premixed aggregates of various granulometry: With variable particle size ranging from 4/3 mm <> 0.100 mm;

In the granulometric scale of coarse 10% - medium 40% - fine

40% – fillers 10%;

Mixing water from 0.5% to 0.8% according to the period and temperatures of the packing of the mortar.

MEDIUM MORTAR - AIR FINISH:

The proportions:

Kg 10,500 grams of binder aged for 6 months;

30 kg of premixed aggregates of various granulometry:

With variable particle size ranging from 3/2 mm <> 0.50 mm;

In the granulometric scale of coarse 10% - medium 40% - fine

40% – fillers 10%;

Mixing water from 0.5% to 0.8% according to the period and temperatures to the packing of the mortar.

AIR MORTARS MADE HYDRAULIC:

Our air lime can be made hydraulic and employed in humid or submerged environments, to carry out plaster work and intonachini, modeled surfaces decorated and give shape with reliefs of ornamental shapes. Adding at the time of prepare the mixture of mortars (binder + siliceous aggregates) aggregates fines of reactive products of silica/alumina etc. which are the sands originating from volcanic eruptions such as the pozzolana, azole, lapilli, trass, while cocchiopesto and kaolin (they are derived from the cooking of clays) are strongly hydraulic

(aluminum silicate) and compatible by affinity to our binder traditional, calcium hydroxide.

It is made up on site with this very simple mixture the ancient Roman cementum, a totally natural hydraulic binder and Ecological, without impurities or industrial additives.

The robustness of this excellent hydraulic mortar is proven over time, and its resistance can still be observed in the Monuments built by the Romans, still in a perfect state of conservation,

both if located in rigid climates and in marine climates. Hydraulic aerial mortars have excellent mechanical resistance, preserving the typical plasticity, workability and elasticity of aerial kicks. The pozzolanic reaction favors the joints between binder and sand, keeping the mortar porous with the breathability and antifreeze typical of air lime, these properties allow moisture to evaporate easily from mortars.

Retains properties in flexibility and resistance under stress, with little tendency to form efflorescence, nor to give shape of soluble salts, nor to the formation of molds and bacteria, with excellent waterproofing.

Hydraulic aerial mortars are recommended for Restoration and Recovery of Historical Artistic Monumental Buildings, since they are "softer and more ecological" than cements and other hydraulic binders industrial.

It is a natural and ecological binder, it has no polluting effects on the environment, without being harmful to housing health, used always used to make historic hydraulic mortars

Traditional.

Long-term properties of air lime hydraulic mixtures maintain their plastic properties over time, with good suction to the masonry, greater yield and mechanical resistance, durability in the long term in very humid or submerged environments, very high resistance to sulphate aggression, and with excellent resistance to frost and decay.

They are used in all sectors for their ease of packaging and workability of the mortars, for the precious and harmonious appearance that the surfaces obtain, and which make it a valid product always used.

CLASSIC EXAMPLES OF QUANTITIES TO PACK IN SITE OF MEDIUM HYDRAULIC MORTARS:

MEDIUM STANDARD HYDRAULIC MORTAR WITH SANDS PYROCLASTICS;

10 kg of traditional seasoned lime putty cream at 6 months;

10 Kg of pyroclastic materials, grain size scale from 1 mm <> 0.50mm;

20 kg of quartziferous silica sand 4/3 mm <> 0.200 mm;

In the granulometric scale of large 10% - medium/large 30% - medium/fine 50% - filler 10%;

Mixing water, the percentage of water on the total mix varies from 6% to 7% the percentage varies according to the period and temperatures of the packing of the mortar.

N.B. If cocchiopesto is used instead of materials pyroclastic, in the same quantities, the percentage of water is 10% 11%.

MEDIUM-FINE STANDARD HYDRAULIC MORTAR WITH COCCIOPESTO SANDS:

Kg 10,500 grams of traditional lime putty cream 6 months seasoning;

10 kg of cocchiopesto sand with a granulometric scale of 1 mm <> 0.50mm;

20 kg of quartziferous silica sand 3/2 mm <> 0.50 mm;

In the granulometric scale of large 10% - medium / large 30% - medium/fine 50% – of fillers 10%;

Mixing water, the percentage of water on the total mix varies from 10% to 11% the percentage varies according to the period and temperatures of the mortar packaging.

N.B. If pyroclastic materials are used instead of the cocchiopesto, in the same quantities, the percentage of water is of 6% 7%.

In hot and muggy periods it is advisable to mix in the dough of the mortar, an optimal amount of basic cellulose from 2% < > 5% (the percentage may vary based on its quality).

Basic cellulose has the property of retaining once wet the water and gradually return it to the mortar to adjust the right internal humidity in the setting and hardening phase, avoiding any dehydration and loss of binder strength.

If desired, clay, cocchiopesto, the fiber of natural hemp, flax fiber, straw etc.

Due to the qualities of our binder they can be packaged mortars also using larger granules up to 6 mm < > 0.200 mm;

For each layer, do not exceed 1 cm in thickness;

For higher thicknesses, spread the mortar in intervals from a time that varies from 12 hours to 24 hours from each other, in consideration of the season and temperatures;

The mortar, after being applied in the desired thickness, it must be kept moist (according to the periods and ambient temperatures) for the time necessary for the surface to set and harden (recommended from 12 hours to 24 hours);

Operating temperature: ambient +5 / +35 °C;

Time of use of the mix: from half an hour to less than 1 hour (hydraulic mortars) from 2/4 hours (aerial mortars), in consideration of the season and the temperature;

Our traditional lime slaked cream is taken as it is from the storage tank and stuffed without adding water;

Our traditional lime putty cream, is used and mixed as it is supplied by the manufacturing company;

The cream of lime fat from the Marseglia company Srl, once applied, it will maintain its quality and durability over time and the retention of the incorporated granules and of its coloring.

THEORETICAL CONSUMPTION PER SQM OF MALTA AVERAGE BOTH AIR AND HYDRAULIC:

The consumption of the mortar: varies from the thicknesses to be achieved, with the quantity of 25/27 kg of slaked fat cream traditional lime combined with 75/81 kg of aggregates mixed with various particle sizes, plasters are made for 6/5 with thicknesses that vary from 1 cm to 0.8 mm per square meter, and in accordance with the funds and surfaces underlying;

To carry out new works and/or restoration works: of ancient plasters, of shapes of decorative ornaments both smooth and in relief, frames, colored stucco, jambs, friezes, etc.,

the quantities vary according to the thicknesses and surfaces to be treated and to level up.

THEORETICAL CONSUMPTION PER SQM OF MALTA

MEDIUM – FINE EITHER AIR OR HYDRAULIC:

The consumption of the malt: it varies from the thickness you want obtain, with the quantity of 25 kg of fat putty cream of traditional lime combined with 75 kg of aggregates mixed with various particle sizes;

plasters are made for 13/11 square meters with thicknesses that vary from 0.7 mm to 0.5 mm per square meter, in correspondence with the granule greater in the granulometric curve used and in conformity of the underlying funds and surfaces;

To carry out works and/or restoration works: of plasters, of decorative ornaments both smooth and in relief, frames, stucco jambs, friezes, etc., quantities vary according to thickness and the surfaces to be treated and leveled.

COLORING OF THE BINDER WITH AGING AT 6 MONTHS:

Our cream of lime fat is suitable for yours right degree of alkalinity to be coloured, with earths or pigments natural obtaining pastel shades. The most used ancient technique is those of joining the pigments in the binder, with a micro-granulometry extrafine, have the property of being uniformly dispersed throughout the binder and obtain a homogeneous colored paste.

THE STEPS FOR COLORING WE RECOMMEND:

To color the binder, add the pigments or earths little by little colored from 3% to 6% (according to the density of the desired coloring) on the quantity of the binder alone, in mixers at low revolutions, for a useful period for the dispersion of the pigment, obtained the desired coloring, join the sands in the specifications above listed.

And/Or by combining the pigments or colored earths a little at a time, in a composed of lime milk (so mixed) 1 Kg of binder and 8/10 liters of mains water, stirring slowly, once dispersed the pigment and obtained the tint, pour it into the binder and mix slowly, once the solution is mixed, the sands are combined in the specifications listed above. Thus obtaining a historic mortar colored to make plasters - finished plasters and colored, to create decorative ornaments both smooth and in relief, frames, stucco, jambs, colored ornaments etc...

While to create dull, colored veils, wall colors use the colored lime milk, composed as follows (1 kg of binder and 8/10 liters of mains water and add the earths or natural pigments).

With this ancient methodologies, the mortars or the milk solution of colored lime, once applied they will keep for a long time the coloring, since the color is fixed in the binder, in the carbonation stage of setting and hardening, forming a- single mass.

ROLLING AND HOMOGENIZATION OF THE BINDER AT 6 MONTHS:

Upon request, this seasoning can be rolled and homogenized, this operation serves to eliminate those tiny grains, naturally present in lime putty and what about they also partially form the skeleton in the plasters and intonachini.

However these micro granules could affect the fine aesthetic finishes of the decorative ornaments are smooth both in relief, frames, colored stucco, jambs, friezes, paintings

murals and/or glazes etc.

Test description	Unit of measure	Result
CaO+MgO content UNI EN 459-2	%	90.7
MgO content UNI EN 459-2 % 0.3	%	0.09
SO3 content UNI EN 459-2	%	4.3
CO2 content UNI EN 459-2	%	0.02
Free CaO content UNI EN 459-2	%	88.8
Free water content UNI EN 459-2	%	54.7

Determination of stability (UNI EN 459-2)

Stability test result:

- The slaked lime specimens did not show expansion cracks and consequently passed the test.

FOTO

Before the treatment

FOTO

After the treatment

Test description	Unit of measure	Result
pH value	%	12.0
Calcium carbonate content (Calcimetry with Dietrich-Frühling calcimeter)	%	0.09

GRANULOMETRIC DISTRIBUTION (UNI EN 459-2)

Sieve mesh opening (mm)	Unit of measurement	Residue	Passing
0,200	%	0,0	100,0
0,090	%	0,1	99,9

DETERMINATION OF WATER VAPOR PERMEABILITY (UNI EN 1015-19)

Performance	Symbol	U.M.	Sample		
			A	B	C
Flow	$\Delta G/\Delta t$	[kg/s]	3,51 - 10 ⁻⁰⁸	3,71 - 10 ⁻⁰⁸	3,93 - 10 ⁻⁰⁸
Permeance at water vapor	Λ	[kg/m ² s Pa]	1,86 - 10 ⁻⁰⁹	1,97 - 10 ⁻⁰⁹	2,10 - 10 ⁻⁰⁹
Vapor permeability coefficient (μ)			7,0	6,1	6,6
AVERAGE vapor permeability coefficient (μ)				6,6	

CERTIFICATIONS EU 305/2011

STATEMENT IN PRODUCTION

AND MCPF AGING CERTIFICATE:

Production certifications: it starts with wood cooking pure limestone, obtained at a low temperature (about 840-860°C), quenching of the oxide obtained, subsequent seasoning in

tank for obtaining the pure lime putty cream fat completely extinguished with a high content of calcium hydrate, period of the months concerning the maturation in the tank. The data of various processes must be transcribed in the marked Document, "European Standard, Certified in the Control Manual of Production in the MCPF Factory "della Marseglia lime Srl.

Drawn up in the Standard of the New EU European Regulation No. 305/2011. Report the date of cooking, the date of the next shutdown, the Date of the beginning of the seasoning, with reference of the tank and months of maturation, including the Analysis of laboratory of processed lime putty cream, indications of the quality and title of the binder. (documents filed in archive)

SPECIFICATION ITEMS OF THE PRICE LISTS REGIONAL CULTURAL HERITAGE:

Lime putty is included as a binder in the specification of the items of the Specifications of the Regional Preciari Beni Culturali e other price lists of Public Works, to prepare traditional mortars

based on aerial or hydraulic limes, for Recovery works in Historic Monumental Building sector OG/2 and for interventions of Conservative Restoration in Category OS/2A – OS/25.

PACKAGING: 6 MONTHS

Shipping by Pallet:

of 5 buckets/bags of 23 kg each.

of 10 buckets/bags: of 23 kg and/or bags of 25 kg each;.

of 15 pails/bags: of 23 kg and/or bags of 25 kg each;

of 20 buckets/bags: of 23 kg each and/or bags of 25 kg;.

of 40 buckets/bags: of 23 kg each and/or bags of 25 kg each

Order code: GCS/M6

STORAGE:

If you store the bags or sacks indoors and covered, rest them on platforms and without drilling its casing and sheltered by strong ones temperature changes, the product will remain intact inside for over 24 months, improving its characteristics in the phase of mixing and drafting.

HANDLING:

Hazards identification

The substance is corrosive to the eyes;

Repeated or prolonged skin contact may cause dermatitis;

The preparation is a medium strong base which reacts with acids.

INDIVIDUAL PROTECTIONS:

Overall body protection in non-woven fabric;

Hand protection: rubber or latex gloves;

Face protection: goggles;

Respiratory protection: dust masks;

Foot protection: safety shoes.

FIRST AID MEASURES:

Skin Contact;

Rinse the skin with plenty of water or with a shower;

Eye contact;

Wash with a non-pressure water jet for at least five minutes;

If contact lenses are used, remove them immediately;

If necessary, transport the victim to hospital.

DISPOSAL:

The bags and the material must be disposed of in accordance with current regulations, it can pollute and change the PH of the soil or watercourses.

PRODUCT STANDARDS:

The regulations that certify the lime putty used as aerial and/or hydraulic limes for construction in the Works sector Public, they must comply with the UNI EN 459-1 Standard Marked CE and to

follow in the Declaration of Conformity Document D. or. P. CPR (EU) N° 305/2011, and as understood in the circular N° 1767 with law 21/06/1964 N°463, and as currently decreed the Standard of the UNI 11488/2021 Regulation on Cultural Heritage to prepare Traditional Historic mortars on site.

And as the standard from the European Directive CE EN 998-1 cites:

2016 (GP) (CR), binder, used for making mortars generic for interiors and exteriors. The data from the analysis of the lime viva in zolla (from which seasoned lime fat is obtained) included in this site, by Marseglia lime Srl, are certified as calcium limestone CL/90S PL UNI EN 459-1 (GP) (CR) with a free CaO content OF 88.80% UNI EN 459-2 and with content total of (CaO+MgO) at 90.70%, UNI EN 459-2, with Marking CE, D.o.P certified and approved with CPR (EU) No. 305/2011 in certificate of conformity on the quality of factory production MCP extension.

Our traditional lime putty cream production it is still made in the Ancient and Artisan methods. There Limestone is fired in an ancient vertical draft kiln natural, with a continuous cycle of wood-fired cooking and subsequent cooking tank seasoning.

The raw material used to obtain our cream of traditional lime putty, are our crystallines Apulian limestone (with a high content of calcium carbonate > 95.1%) intentionally split to various sizes from large medium to small and placed in the cooking chamber so as to form spaces between the stones in which the hot air can pass moisture produced in the combustion zone, once purified from the ashes.

It is conveyed by the cooking system for thermal rise of the heat in a completely natural way (chimney effect) spreading between the voids of the limestone stones, gradually heating them up to limestone calcination temperatures of 860°C.

The cooking chamber is separated from the combustion area of the shaft furnace, the two chambers communicate with each other via outlets of the fireplace connected to the cooking area, called altars.

The combustion chamber, to develop color, use as propellants untreated faggots and lagne (without various presences o contaminating paints). The ashes are recovered and disposed of from the four mouths placed at the base of the vertical shaft kiln.

Firing of crystalline limestones (calcium carbonate) begins with the insertion in the raised part of the oven (funnel), for the first important limestone drying phase, staying for a long time and with low temperatures that vary from about 80°/120°C, after which they enter by natural descent in the upper part of the cooking chamber, where they remain for plenty of time for the second drying phase with temperatures increasing ranging from about 140°/250° C.

This method of gentle drying of limestone is carried out for several days it has been used for millennia, only feasible with these Ancient shaft ovens with continuous cooking cycle with natural draft, it is used to prepare and avoid limescale in the following ones phases of rising temperatures to undergo sudden thermal shocks, abruptly setting the limestone stones on fire and causing them the rapid loss of water.

Plus our Ancient shaft oven with its separation system from the combustion chamber to the cooking chamber, avoid putting the flames in direct contact with the material cook inevitably altering it, compromising the quality and the purity of the limestone, as well as the whiteness, also for the rising ashes.

This ancient stage of limestone preparation will deliver us at the end of cooking a clean, porous, friable, reactive fine oxide of lime, with very reactive single grains in the hydration phase.

(While in modern forced ventilation ovens, powered by gas or other fuel, the resulting calcium oxide is cooked with temperatures ranging from 1150°C to 1300°C (fired lime a death), moreover the stones introduced are of small size, which coming into contact with the flame drawn in and directed mechanically inside the material firing chamber calcareous, which by overheating causes its rapid loss of water, the calcium oxide obtained from it will have, the higher the cooking, the greater the amount of grains large compact and adherent to each other, therefore not very porous and with lower capacity for reactivity in hydration in the quenching phase.)

Once dry, the limestone is ready to enter the intermediate part of the cooking chamber with temperatures that vary from about 300/400C°, it remains in this area for the period necessary. Later they arrive in the central part of the chamber of cooking, reaching the optimal temperature on 500/600

Approximately C°, at this temperature the calcium carbonate begins to dissociate gradually into calcium oxide and release carbon dioxide.

Eventually they reach the end of the oven for cooking final, gradually reaching the optimal temperature around 840/860C°. This cooking phase varies from 10 to 12 hours, to complete the transformation of the calcium carbonate CaCO₃ into calcium oxide CaO, this reaction occurs by decomposition thermal of the limestone (endothermic reaction) producing a pure homogeneous, porous, reactive calcium oxide CaO releasing carbon dioxide CO₂

In the reaction $\text{CaCO}_3 \rightarrow \text{CaO} + \text{CO}_2$.

For the purity of our calcium oxide (CaO) > 95.1%, we obtain an excellent traditional calcitic lime.

At the end of cooking, the CaO live clods are reduced from their initial weight by 40% (it also causes the loss of carbon atoms C e oxygen O) and the living clods take on a crumbly consistency very porous. Also the gray color variations of the limestone are lost and the stones become mostly white. The complete cycle cooking takes 14/15 days, depending on the conditions external climatic conditions (presence of wind energy), climatic factor which accentuates the fireplace effect of the cooking system natural draft oven.

Once obtained an excellent homogeneous calcium oxide traditional basic, is immersed in plenty of water, and for the strong reactive basic reaction (natural exothermic) leads into boiling the living clods and is releasing a violent heat and the consequence disintegration of the cooked stones into a pulp (living clods) due to the expansive effect of the transformation from oxide

calcium CaO to calcium hydroxide Ca(OH)₂

In the reaction $\text{CaO} + \text{H}_2\text{O} \rightarrow \text{Ca(OH)}_2$.

In this extinguishing phase, the lime oxide dissolves in slaked lime, lime hydroxide, Ca(OH)₂ forming single porous macro - prismatic crystals (portlandite). The thick milk of lime Ca(OH)₂ obtained is immersed in the maturation tanks, for the months necessary for its employment.

Lime hydroxide crystals Ca(OH)₂ in the ripening phase day 6 months, they undergo important morphological changes and resize them with the formation of single porous micro-crystals tubular / hexagonal (portlandite).

With this ancient method, a slaked cream is obtained traditional lime fat at 181 days, which is thicker, creamy, thixotropic viscous and slightly oily, improving in plasticity, processability and water retention with properties natural in Porosity, Breathability, Dehumidifying, Antibacterial, antifreeze.

The carbonation of lime putty cream (setting and hardening reaction) of calcium hydroxide, takes place in the following reaction thus composed from a formal point of view.



Finally returning to its initial state of calcium carbonate

CaCO₃ with water loss H₂O.

Thus it is a natural and ecological binder, it has no polluting effects on the environment, without being negative for housing health, without giving shape over time to caustic soluble salts nor efflorescence or water retention.

BINDER USED TO MAKE HISTORICAL MORTARS