deGruchy's LIME WORKS.us™
Makers of ecologic® Brand
Mortar & Plaster For Historic Restoration and Green Building
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Saint-Astier

Natural Hydraulic Lime 5 (NHL 5)

Saint-Astier Natural Hydraulic Lime 5 (NHL 5) is an industry standard for historic restoration. It is used as the sole lime binder for recreating durable mortar, stucco and plaster formulas wherever NO Portland cement was originally used. Its properties also make it effective for building new sustainable structures where lower embodied energy materials are desired. Saint-Astier NHL is pure and natural, free of additives and has been in use throughout the world for over 165 years.

NHL 5 is a higher strength or "eminently" hydraulic lime. It is used where a respectable amount of free lime, (that which is responsible for self-healing), is desired along with an excellent modulus of elasticity and high vapor exchange is maintained for the NHL range. All Saint-Astier Natural Hydraulic Limes set with air and water. NHL 5 reaches its initial cure in about two days. This lime is used for making denser and durable mortars and lime concrete which when mixed together with aggregates and water can be used repair wall heads and to lay up mass stone walling and veneers more effectvely due to the speed or cure time to build upon work the next day. It can be used to create a denser base coat for interior lime plaster in showers and over top of absorptive substrates like strawbale to inhibit water infiltration through this final layer. It can be used in extreme marine environments and will withstand extreme freeze/thaw cycles.

Benefits

The same unique deposit of limestone located at Saint-Astier quarry in France was used by the Romans for structures that still stand today. Saint- Astier is environmentally friendly because the production of Saint-Astier NHL emits 80% less carbon into the atmosphere during its production than the C02 emissions from the production of Portland cement. During curing, Saint- Astier NHL continues to absorb and sequester carbon dioxide starting at the beginning of its life cycle. This further reduces the overall carbon footprint of a project.

Maintaining good vapor permeability in the exterior envelope of an historic building will allow the historic masonry units themselves to have an even longer service life thus keeping them in a better state of conservation. Vapor permeability is also key to the longevity of new sustainable construction projects. Saint- Astier NHL has low capillarity and high vapor permeability. Independent studies have shown Saint- Astier NHL to have a higher level of vapor permeability than all mortar mixes containing any amount of Portland cement. This remains true while achieving comparable strengths for many applications without the need to add Portland cement or a Pozzolan to achieve proper and effective mix designs.

Saint-Astier NHL is completely immune to sulfates and salts. Alkali-silica reactions, common with Portland cement mortars do not take place with Saint-Astier Natural Hydraulic Limes. This is due to the absence of tri-calcium aluminates only created in high temperature fired kilns which are required for the production of Portland Cement.

Saint-Astier NHL has an excellent modulus of elasticity. Unlike Portland cement-based mortars, Saint-Astier NHL mortars limit the requirements for strategically placed control joints in walls. The breathability of mortars made with Saint-Astier NHL also reduce, if not eliminate, the requirement for weep vents in curtain or veneer walls.

Eco-friendly Characteristics:

- High vapor exchange qualities
- 80% less carbon emissions than the Portland cement alternative
- Re-absorption of CO_2 in curing
- Will not deteriorate timber

Mixing to make Mortars and Plasters

Saint-Astier NHL 5 must be mixed with natural or manufactured sharp sand with at least 4 grades forming a substantial part of the sand and no more than 3% of particles smaller than grade #200 (0.075 mm). Sand must be clean and free of clay and silts. Clean, potable water is recommended. Sea water can be substituted. Add more water only until the mix contains the minimum amount of mixing water to become workable. Keep water ratios consistent between batches to ensure consistency in material performance and appearance. Mix for a minimum of ten minutes, let rest for five minutes (for hydration) then continue mixing for another five minutes. Judge workability

only after continuous mixing.
DO NOT ADD PORTLAND CEMENT, LIME, FLY ASH, POZZOLANS, ACCELERATORS, RETARDERS TO THE MIX.

General Application

Mist the substrate and any previous lime mortar application with water immediately before a new application but only as a slight dampening to control absorption. No standing water should remain during a new application. If any substrate is retaining inordinate amounts of moisture due to rising damp, bad flashing or moisture from a chimney cavity, this must be corrected before new work begins. ASTM has reports on normal absorption rates for most building materials not explicitly covered by individual manufacturers.
Wait a minimum of 10 days between coats of stucco (render). Within 24 hours of an installation rub closed any cracks that form before the next coat is installed. Saint-Astier NHL mortar can be reworked within 24 hours depending on weather conditions. Protect the new work for 72 hours from wind, direct sun, freezing temperatures, excessive heat and rain.
Do not apply at temperatures below 40ºF (4ºC) or above 85ºF (29ºC).

Aiding the curing of the installed material:

Protect the work outside by using spring clamps to hold burlap or jute a few inches away from the work and not in contact to avoid staining the work. Wet the work and the covers a few times a day for a three day curing period. Breathable fabric covers allow moisture to slowly escape and encourage a slow cure. Tarps could be used on the outside of the scaffold to protect from hot sun, driving rain and drying winds.

Disposal: Sweep bulk material into containers and dispose of in a landfill in accordance with all local, state and federal regulations. The cured product is non-hazardous.

Technical Data

Strength factor	5 (Eminently hydraulic)
Compressive strengths	1277 psi @ 24 months w/ Lime:Sand mix ratio of 1:2.5
Residue	@ 0.09mm: 7%
Density	Typical 43.7 lbs/cu.ft
Available (free) Lime $Ca(OH)_2$ after slaking	15-20%
Packing	55 pound bags
Whiteness index	67
Surface Cover	244 sq.ft/oz
Expansion	<3/64”

Shelf Life	8-12 months kept sealed and dry
Working Time	24 hours
Cure time	48 hour initial cure – 28 day full cure

Average coverage using a Lime : Sand mix ratio of 1:2.5

- Repoint about 300 sq. ft. of standard brick joints @ ⅜” wide and ¾” deep, per bag
- Repoint about 50 sq. ft. of rubble stone wall @ 1” wide and 1 ¼” deep, per bag
- Lay about 160 standard brick per bag
- Stucco/Plaster 150 sq ft @ ⅜”

Safety:
Wear adequate protective clothing to avoid prolonged contact with the mortar. To avoid dust contact with eyes and possible inhalation wear glasses and the appropriate dusk mask especially in areas not properly ventilated.

Contact

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