

deGruchy's

LIME



WORKS.us<sup>TM</sup>

Makers of

ecologic<sup>®</sup>

Brand  
Mortar & Plaster  
For Historic Restoration  
and Green Building

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### **Advice about locally available (Non-Hydraulic) Hydrated Lime**

We don't sell Hydrated Lime because it is locally available in the US. However, lime comes basically in two forms, High Calcium which is pure and then two forms of impure lime which is designated either as Dolomitic or as Magnesian lime. Any of these limes could be processed into Hydrated Lime for building and sold as a "pre-slaked" dry powder - the most commonly used and known lime for building purposes.

Hydrated Lime comes in the powder form, designated as Type N, NA, S or SA, or in a paste form known as Lime Putty. Although it has wonderful physical and aesthetic qualities, Hydrated Lime has very strong limitations in the construction industry. It is used primarily with Portland cement to control the setting time and to add plasticity to mortar. Modern processing procedures for most all Hydrated Lime greatly restricts its use as a sole binder in Lime/sand mortars that will remain unprotected from the elements. An exception would be low-temperature fired High Calcium lime which, being around 98% pure calcium kept chemically intact by low-temperature firing, can be used to make a durable mortar without Portland cement. However this lime is mostly available for the food industry and will still require a six week protected cure time. Hydrated Lime sets only by carbonation in the re-absorption of CO<sub>2</sub> and thus, thicknesses are very limited for mortars and plasters. Hydrated Lime alone with sand is not suitable or practical for standard thicknesses of scratch and brown coats in a plaster or stucco. High quality Hydrated Lime will work in most cases as an interior finish coat only requiring additional re-blending during the work.

The application of non-hydraulic lime for mortars and plasters requires very highly skilled labor and special care. This is especially true for quicklime to avoid physical harm from lime burns. Quicklime is the term used when obtaining a burned building lime prior to it being slaked with water or "hydrated." Consequently, these limes become a specialty product with associated complexities and costs.

### **Advice about synthetically created Hydraulic Lime**

Hydraulicity can be given to Hydrated lime by only the addition of ordinary Portland cement or what is called a "pozzolan." The types of pozzolans vary with different performance outcomes for different pozzolans. A warning when introducing a foreign substance to create a pozzolanic hydraulic lime is therefore having immediate or long-range inauspicious consequences.

It is not advised to use hybrid products with unknown and unproven performance results. Hybrid products should be found in real service applications for an adequate time, (years), in order to draw respectable conclusions. The Romans synthetically created Hydraulic Lime when the Natural Hydraulic Lime was not conveniently available to them. However, they never

started with processed Dolomitic Type "S" (Double) Hydrated Lime that may be a dead-burned product incapable of standing on its own merits as a sole binder in unprotected external applications. The structures which are currently still in existence in the world, which were built by the Romans, also utilized pozzolans which have stabilized since they have proven what can be expected in a final performance outcome if the pozzolans were used in a similar application starting with a similarly obtained and produced lime. Except for the known outcome of using Portland cement as the pozzolanic agent with Type S Hydrated Limes in modern new building work, it is not advised to use synthetically created hybrid hydraulic lime with no track record for any building of value. This is especially true when the subject is the repair of historic heritage buildings. Any sustainable new structure which is being built with the intent of creating a sustainably durable and long-term service life component should avoid the experimental use of a synthetically created hybrid hydraulic lime.

If one were to add a pozzolan to Hydrated Lime then Portland cement would be favored as a material of choice to make a synthetically created hydraulic lime. This is because Portland cement and Type S Hydrated Lime have a known and understood outcome for making successful modern mortars and stuccos which have been in use over 50 years for many modern applications. When value engineering a synthetically created Hydraulic Lime, Portland cement and Type S Hydrated Lime is a favored approach solely because of the low expense coupled with the familiarity of its use by masons and the known service life found in certain applications.

This is not, however, the case for the repair of vintage buildings and for pursuing lower embodied energy mortars. For the purpose of building sustainably and therefore building "Green" it is advisable to take a scientific approach when designing a mortar. In the final analysis any Hydraulic Lime ordered and utilized on a project should be sure to be the type required to meet all the requirements of the application first and foremost. One must secure in advance all proven, long-term success evidence before carrying out the application. If this due diligence is not adhered to there could be disastrous results for the project built with a hybrid hydraulic lime. Knowing that the St. Astier Natural Hydraulic Lime range has a proven track record that can be relied upon is also a good deterrent to the trial and error approach for mortar being used to build valuable structures.

Undue expense for obtaining a hybrid lime mortar for building is not warranted if the application fails pre-maturely or causes surrounding failure for other building components resulting only in excessive overall building expense without benefit. The initial benefit of using a synthetically created hydraulic lime may be focused on initial energy savings in raw material production. However, the long-term energy loss due to the cost to replace failed materials if a hybrid hydraulic lime fails to work as intended becomes for the owner, the architect and the installers just an expensive and troublesome exercise in futility.