



Secil Natural Hydraulic Lime (NHL)

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1. Introduction

Secil Natural Hydraulic Lime: A Centennial Binder

Natural Hydraulic Lime - NHL

The need for building in maritime areas has forced the search for binding materials capable of hardening under water. The research on this phenomenon, by John Smeaton, made way for the construction of the Ecclestone Lighthouse in 1756.

Founded in 1891, Secil Martingança, S.A. is proud to be one of the oldest Hydraulic Lime production units in the world! However, there has always been a concern in joining our centennial experience with modern technology, always aiming for a sustainable and eco-friendly process.



Old ceramic chimneys



Modern filter system

Eco-Friendly Mortars – Natural Hydraulic Lime and Co2 emissions

Harmful Co2 emissions, acknowledged as being a major cause of the greenhouse effect, occur during the production of both cement and lime. However, with lime burnt at temperatures of circa 900°C and cement exceeding >1450°C, more energy is required for the production of cement. Additionally, a study of the lime cycle indicates that an equal amount of CO2 is retained during the carbonation/setting process as is released by the limestone during burning. As a consequence, lime mortar is by far, the more ecologically preferable product.



3.1 Secil Natural Hydraulic Lime

Secil Natural Hydraulic Lime (NHL) features the same properties it used to have, decades ago, before the introduction of Portland cement. It is an exclusive result of the chemical composition of its natural raw materials.

Our **Natural Hydraulic Lime** features a unique brownish colour due to the characteristics of the stone that we extract from our quarry, which is the same used since the beginning of the unit's existence. Regular tests are carried out in our laboratory to ensure our **NHL** maintains the same specifications and quality.



Our quarry from where the stone is extracted



Secil Natural Hydraulic Lime



Where can we use Secil NHL?

- In the production of mortars, as only binder, or mixed with other hydraulic or aerial binders, providing them workability and flexibility, significantly reducing the retraction in hydraulic mortars;
- In the production of rehabilitation mortars, as only binder, in the execution of exterior renderings over old substrates (contact our technical services for the evaluation of applicability in each case);
- In soil treatment, improving the mechanical and workability characteristics;
- In the production of blocks and other construction artefacts;
- As a filler substitute in road construction.

Why use *Secil Natural Hydraulic Lime*?

- ↗ Excellent quality / price ratio
- ↗ High resistance to cracking
- ↗ Perfect and durable adhesion to substrates
- ↗ Allows excellent water vapour permeability while acting as an efficient water-repellent.
- ↗ In a mixture with cement, it provides a greater workability and plasticity to mortars
- ↗ NHL as a Binder, according to the NP EN 459-1:2003 and NP EN 459-1:2010
- ↗ NHL as Filler substitute in bituminous paving, according to the NP EN 13043
- ↗ Produced by a certified ISO 9001 company

4. Secil NHL Mortars

4.1 The Importance of NHL Mortars

Natural Hydraulic Lime – The importance in conservation and rehabilitation

Developments in cement technology for volume construction in the 19th and early 20th century, together with the perceived advantage of increased mechanical strength, served to eliminate the need for the traditional skills of craftsman to create a lime mortar. This has led to a distortion of the concept of mortar to such an extent, that today a 'traditional mortar' is defined as a blend of cement/sand/lime, whereas it is little more than a modern process adopted to satisfy the demands of mass building. From the beginning of this century until the mid 1970's the benefits of lime in conservation works were widely ignored. By consequence, many ancient structures were damaged by the application of incompatible mortars of cement.



Rehabilitation works



4.2. The Product Range

Natural Lime Mortar for Old Masonry *Consolidation*

Dry mortar, formulated with natural Hydraulic Lime, criteriously selected siliceous and calcareous aggregates and adjuvants, for Old Masonry consolidation. It also features specific thixotropy, adhesion and durability properties adapted according to it's field of application. **(Fig. I and II)**

Natural Lime Mortar for Cladding

Dry mortar, formulated with natural Hydraulic Lime, criteriously selected siliceous and calcareous aggregates and adjuvants, for Old Masonry consolidation. This mortar was specifically developed for building conservation and renovation, for old masonry or new construction wall covering. **(Fig. III and IV)**

Natural Lime Finishing

Dry mortar, formulated with natural Hydraulic Lime, criteriously selected siliceous and calcareous aggregates and adjuvants, for a breathable fine-layer covering, in conservation and renovation solutions for exterior renderings in old masonry. **(Fig. V)**



Old masonry wall

Fig.I



Fig.II



Fig.III



Fig.IV



Fig.V



Why use Secil Natural Hydraulic Lime mortars?

- ↪ Hydraulic lime mortars feature great workability and plasticity
- ↪ The setting process is slower which also allows a longer working period.
- ↪ Allows excellent water vapour permeability while acting as an efficient water-repellent. Reduction of condensation risk.
- ↪ The dimensional variations, due to thermal or other variations, can be absorbed without damaging the substrate, offering resistance to cracking.
- ↪ Perfect and durable adhesion to substrates
- ↪ Excellent price/quality ratio
- ↪ CE Branding on all products
- ↪ NHL as a Binder, according to the NP EN 459-1:2003
- ↪ NHL as Filler substitute in bituminous paving, according to the NP EN 13043

4.4. Image Gallery



Theatre in Lisbon, PT (XIX Century)



St. Francis Convent in Coimbra, PT (XVII Century)



Seteais Palace in Sintra, PT (XVIII Century)



Museum in Lisbon, PT (XIX Century)



Museum in Coimbra, PT (1911)