

LISTED BUILDING CONSENT 28374/APP/2024/350.  
CONDITION 3(iii): LIME RENDER MIX DETAILS.

## LIME RENDER MIX DETAILS.

The key difference between Natural Hydraulic Lime (NHL) and lime putty lies in their setting process and suitability for different applications, particularly on brickwork faces. For instance NHL 5 is specified for below ground applications or where high levels of exposure are found such as a Chimney.

### Setting:

- **NHL 3.5 & 5:** These are hydraulic limes, meaning they set by a chemical reaction called hydrolysis when they come into contact with water. This allows them to harden even in damp or submerged conditions, making them ideal for exterior brickwork exposed to rain or for repairs where a quicker turnaround is needed. NHL comes in different strengths, with NHL 5 offering a faster set and higher strength compared to NHL 3.5.
- **Lime Putty:** This is a non-hydraulic lime and sets through a process called carbonation. It reacts with carbon dioxide in the air, slowly hardening over weeks or months. This slow setting makes it unsuitable for wet environments but preferable for historical buildings. The speed of set can be increased by the addition of an impurity such as a Pozzolan.

### Pros & Cons:

#### NHL:

**Pros:** Faster setting, good strength, works in damp conditions.

**Cons:** Not as breathable as lime putty, can be less flexible and more prone to cracking.

#### Lime Putty:

**Pros:** More breathable, flexible, ideal for historical restorations, produces a softer, more traditional finish.

**Cons:** Slower setting, not suitable for wet environments, requires good planning and weather conditions for application.

### Here's a quick summary for brickwork:

**Use NHL:** For repairs needing faster turnaround, exposed exterior brickwork in potentially damp conditions.

**Use Lime Putty:** For historically significant buildings, breathability is crucial, and a softer, more traditional finish is desired.

Applying a lime putty (non-hydraulic) render to an 18th-century building requires a careful hand and respect for traditional methods. The first step is to ensure a sound substrate. We will remove loose mortar and assess how much can be conserved. Small cracks are repaired with a lime putty mix that matches the existing material, which we assess by eye and experience. In critical match scenarios we arrange for a chemical analysis to produce a close match. Further indentations or undulation will be "dubbed out" prior to any harling coat. This process allows for a pre levelling of the surface. We would utilise the Harling coat mix applied slightly thicker in these places.

A typical mix ratio for the render itself might be 1 part lime putty to 3 parts sharp sand, although this can vary depending on the desired finish and the substrate specification. The render is then applied in three coats. A thin coat, called a Harling coat is first applied into the brick or stonework to form a key

for the subsequent layers. A thicker second-coat, of haired lime is applied over the Harling coat surface, this is scratched to provide a key for the final thinner finishing coat, which provides a smooth or textured appearance as desired.

Throughout this process, protecting the render from the elements is crucial. Ideally, work should be done during dry weather with moderate temperatures. The exposed render should be covered throughout the works with breathable sheeting, normally Hessian blankets to prevent accelerating the curing process, also to protect from rain and also in cold weather to prevent frost attacking the surface. Cold weather can also slow the curing process, so work may need to be halted if frost is a possibility. Work will cease when the temperature is below 5 degrees for any sustained period. By following these steps and monitoring and reacting to weather conditions with protection, a lime putty render can effectively protect and enhance an Historic Building for decades to come.

The render will be protected by Hessian once complete for a set period. If the temperature is to be 10 degrees say, we would allow a period of 28 days, if 5 degrees, then it could be 56 days.