Bedding and Grouting

Masonry Walls: Brick, Blocks and Natural Stone

Understanding Mortars

A basic understanding of the function of mortars is required before choosing a mix.
Mortar is used for jointing individual units in a mass of masonry. The final structure must have certain characteristics to function satisfactorily. It must carry the load for which it was designed it must be durable and it must give protection against wind, rain and frost. Mortars should develop sufficient strength and at such a rate as to be capable of withstanding the stresses to which they will be subjected during the construction of the building and subsequently when the structure is fully loaded. It should not however set and harden so quickly that it becomes inflexible at any stage and cannot accommodate slight movement

Mortar should be permeable in itself, both so that the quantity of free water on the face of the building is reduced, thus reducing the possibility of wind-driven water penetration, and so that moisture evaporation is not concentrated in the masonry, which may then be vulnerable to accelerated breakdown in the vicinity of the joints. Mortar should bond firmly to the units so that a tight joint is obtained through which rain will find it difficult to penetrate. Mortar should be workable, so that the material may be applied easily and to ensure that the vertical as well as the horizontal joints can be adequately filled. Masonry buildings rely on their mass and the interlocking of individual units for their stability, and the mortar in a masonry building serves in the main to provide a bedding medium for often very irregular components, filling the voids and maintaining the wind and watertight integrity of the building.

Choosing an Appropriate Mortar

Most important of all: the mortar should be compatible with the last masonry. Do not introduce mortars containing potentially damaging elements or that can constitute an impermeable barrier obstructing vapour exchange and retaining moisture. The consequences in a relatively short time could be disastrous and, in most cases, irreversible. Mortars should be weaker than the masonry or the stone units so any cracks will occur in the mortar joints where they can be easily repaired. Furthermore, more strength usually translates to less vapor exchange. Vapor exchange is essential for the durability of the construction and should not be sacrificed for extensive useless strength.

Resistance to Salts

Soluble salts (sulphates, nitrates, and chlorides) can be present blocks, bricks, stone, in ground water or from airborne pollutants. All St Astier NHL limes are resistant to salts. They do not contain the reactive components such as high levels of aluminium, potassium and sodium oxides and gypsum. Existing salts will therefore be allowed to migrate out of the structure without affecting the soundness of the mortar and, in time, be washed off.

Protection and Good Working Practice

Current codes of practice for working with cement-gauged mortars are also relevant when working with lime mortars and cover most of the basic requirements for good working practice

although these practices are seldom if ever carried out correctly. For all mortar work, best practice requires proper curing and aftercare against the effects of drying winds, strong sunlight, rain and frost. Lime mortar may require slightly longer curing times but the methods and principles are the same.
Where scaffolding is in place, fine mesh debris netting securely fixed to the outside of the scaffold gives basic protection to the working area slowing down strong wind while allowing good natural light for the works. Securely fixed tarps or polyethylene placed over plywood sheathing on to the top of the scaffold from the wall heads or just below the gutters will ensure that rain does not wash down the face of the walls. As regards external protection the work should be covered with burlap sheets, polyethylene or both. Polyethylene should never come in contact with the work. Accurate records of the minimum and maximum temperatures below the covers should be taken daily, with provision to record these over weekends and holiday breaks.

To avoid rapid drying and consequent high shrinkage, especially in hot or windy weather conditions keep all work damp by repeatedly applying a fine mist of clean potable water, if necessary several times a day, until the mortar has hardened.

Application
Mortar should be plastic and workable but as stiff as possible.

Finishing
To ensure good compaction and adhesion within the joint, the mortar can be tamped firmly back with a stiff bristle brush as it starts to firm up. The timing of this is critical. If it is carried out too soon after placing, fines in the mix will be drawn to the surface and will form a dense skin, inhibiting the proper curing of the mortar. Once the surface of the mortar is firm (usually the next day) lightly scraping the surface to expose the aggregate can improve the appearance of the mortar and make the joints less visible. This process should not be undertaken before the surface has stiffened or mortar will be smeared onto the face of the stone. Brickwork has a number of specific joint finishes too numerous to go into in this general guide, but the principles of timing the finishing of the joint still apply.
The fines in the mix will determine the finished color, therefore a wide range of natural colors is achievable without pigmentation. The whiteness of St Astier limes ensures the best color reproduction of the chosen aggregate.

Some NHL Mortar Mixes

Joint type	*Joint Size*	*Lime*	*Sand*	*Ratio Lime : Sand*
Ashlar / Tuck joint	*1/32" – 3/16" (1-5mm)*	*NHL2* *NHL 3.5*	*#20 (0.8mm) to #200 (0.075mm)*	*2 : 1* *1 : 1*
High porosity masonry	*3/16" – 3/8" (5-10mm)*	*NHL2* *NHL 3.5*	*#18-10 (1-2mm) to #200 (0.075mm)*	*1 : 2* *1 : 2.5*
	3/8" – 3/4" (10-20mm)	*NHL 2* *NHL 3.5*	*#6-3 (3-5mm) to #200 (0.075mm)*	*1 : 2* *1 : 2.5*
Medium porosity masonry	*3/16" – 3/8" (5-10mm)*	*NHL 2* *NHL 3.5* *NHL 5*	*#18-10 (1-2mm) to #200 (0.075mm)*	*1 : 2* *1 : 2.5* *1 : 2.5 or 3*
	3/8" – 3/4 " (10-20mm)	*NHL 2* *NHL 3.5* *NHL 5*	*#6-3 (3-5mm) to #200 (0.075mm)*	*1 : 2* *1 : 2.5* *1 : 2.5 or 3*
Low porosity masonry	*3/16" – 3/8" (5-10mm)*	*NHL 3.5* *NHL 5*	*#18-10 (1-2mm) to #200 (0.075mm)*	*1 : 2.5* *1 : 2.5 or 3*
	3/8" – 3/4" (10-20mm)	*NHL 3.5* *NHL 5*	*#6-3 (3-5mm) to #200 (0.075mm)*	*1 : 2* *1 : 2.5or 3*
Floor tiles or stone slabs	*1/32" – 3/16" (1-5mm)*	*NHL 3.5* *NHL 5*	*#18-10 (1-2mm) to #200 (0.075mm)*	*1 : 2* *1 : 2 or 2.5*
	3/16" – 3/8" (5-10mm)	*NHL 5*	*#6-3 (3-5mm) to #200 (0.075mm)*	*1 : 2*

This document is a guide only and is not intended to be a specification.
Its purpose is to provide the reader with helpful information that may assist in determining the correct choice of materials, methods of application and determine the best working practice.
The guidelines refer to our experience with St. Astier NHL binders and some recommendations might not be applicable to other products.