

Limetec Hydraulic Lime Mortar

Laying Masonry

Method Sheet

1. Introduction

For details regarding the site mixing of mortars, please refer to the Limetec Hydraulic Lime Conventional Mixing Method Sheet.

NOTE: Under no circumstances should additives be combined with Limetec Hydraulic Lime Mortars. This includes substances such as anti-freeze or washing-up liquid. Lime Technology Limited will not take responsibility for any mortar failure due to the inclusion of other substances.

2. Site Practice

To achieve optimum results and enable work to be carried out year round, it is important to give adequate protection to the mortar once it has been laid with the masonry. When compared to cement, lime mortars build up strength or achieve a set over a longer period of time and are susceptible to adverse weather conditions whilst the setting process is occurring. Attention must be given to the weather forecast before and for at least 24 hours after laying masonry.

Protection

Protection guards against the extremes of direct sunlight, driving rain, fluctuations in temperature and drying winds. It enables the mortar to build up strength during the early stages of set. The amount of protection that is needed is directly proportional to the prevailing weather conditions. The optimum conditions for laying masonry is when the temperature is between 8°C and rising and 18°C and falling, and when the sky is overcast. During these conditions there is little or no need to give protection to the mortar. Work must not be undertaken in freezing conditions as this will inevitably lead to frost damage – see later sections.

Wetting of masonry units

It is important to create a bond between the masonry and the mortar and to achieve this certain amount of suction is required. Masonry with high porosity should be pre-wetted in advance of being used, as too high a suction rate will “kill” the mortar

EXPLANATION: if the suction is aggressive, moisture will be pulled from the mortar resulting in reduced workability and prevent easy adjustment of laid masonry together with a weakening of the bond.

Wetting may be necessary in most weather conditions if the masonry units are dry; however the amount of pre-wetting will vary accordingly and will range from dipping the unit into a bucket of water to spraying the units with a water hose. Care should be taken to ensure that the masonry is not overly wet, as this will completely kill the suction, cause the masonry to slip and the mortar to stain the face of the work. Water should be absorbed into the masonry and not run off of the face. Over wetting in cool conditions will also increase the setting time. Pre-wetting should not be necessary in the winter.

EXPLANATION: Hydraulic lime mortars achieve a set through two processes. The first set is achieved through a reaction with water; this is known as the hydraulic set. This occurs relatively quickly but can be influenced by weather conditions, especially temperature. The second set is achieved through a reaction called carbonation. This is a much slower process and is produced by calcium hydroxide combining with carbon dioxide (in the atmosphere and in solution) to create calcium carbonate. This reaction is much slower and can take months to achieve, but builds on the strength of the mortar already achieved through the hydraulic set.

3. Summer Conditions

It is important not to let the mortar dry out too quickly, as this will reduce its strength. In direct sunlight and high temperatures a damp hessian sheet should be draped over the brickwork and then covered with plastic sheeting or tarpaulin. If the hessian sheet shows signs of drying out a mist spray should be used to dampen it down. Similar protection must also be given in drying winds. Generally little protection is required in the summer months

EXPLANATION: Damp hessian sheet will create a humid environment, helping to control the evaporation of water from the mortar, as hydraulic lime mortars need water to be present to enable them to fully achieve a hydraulic set.

4. Winter Conditions

Winter conditions will have the greatest effect on the setting of hydraulic mortars. Protection must be given against rain, drying winds, snow and frosts.

In wet conditions plastic sheeting can be draped over the work. Special attention should be given to the top of the masonry wall to stop water entering through the vertical joints. Protection should remain in place until the surface of the mortar has achieved a set.

In drying winds (but in cold conditions) dry hessian and a plastic sheet or proper frost protection or bubble-wrap should be draped over the completed area to control evaporation and cooling of the wall.

When snow and frosts are forecast or when the temperature is expected to fall below 8°C, protection is advisable in the form of insulation, as this will encourage the mortar to continue setting by keeping residual heat in. To achieve this use dry hessian and cover with a protective plastic sheet (or use bubble wrap). Frost damage will occur as a result of a lack in protection whilst the mortar is damp. Layers should be kept in place until the mortar is firm and a set has occurred (this may take days to achieve in severe conditions). Mortar should not be used if the temperature is at 5°C and falling.

If frost damage does occur do not remove the crust; this will provide protection to the mortar beneath and when the temperature starts to rise, the mortar will continue to set once more. A decision to remove the damaged crust and re-point should be made once a full set is achieved and should take into account the finish required and the depth of damage.

EXPLANATION: Damp conditions coupled with low temperatures will increase the setting time. To reduce these influences ensure the masonry units are not overly wet when laid.

5. Laying Bricks

Lime mortars have better performance and aesthetic qualities (than cement mortars) when used with brick.

EXPLANATION: Mortars used for the laying of bricks should be softer than the brick itself. Cement mortars which are generally harder than brick, are unable to cope with settlement or movement in the early stages of a structures life and this can result in failure. The hard, brittle nature of cement mortars means that any applied stress will lead to cracking and this in turn is conveyed into the brick itself. Due to the soft nature and slower setting times of lime mortars, movement can be absorbed and cracking can be evenly distributed without affecting the brick. Furthermore, cement inhibits the evaporation of moisture from the mortar joint – evaporation instead occurs from the brick face; this leads to salt and ice crystallisation forming just under the brick surface and results in the decay of the brick. Lime mortars, which are vapour permeable, actively encourage evaporation and crystallisation from the joint and therefore protect the brick from decay.

The compressive strength of lime mortar is dependant mainly on the right choice of aggregate. To optimise strength well-graded sharp sands are used, and these can feel slightly gritty when compared to cement mortars which use soft building sands. A consequence of using sharp sand is that difficulty may be experienced in bedding down the brick, particularly if the brick is too dry, so it is important that the mortar bed is laid as evenly as possible and bricks are properly dampened.

The process can be made easier by running a furrow through the mortar bed – the bricks can be placed and pushed down to the required thickness, with the excess being cut off at the face



6. Laying Concrete/Light-Weight Blocks

The process is the same for laying bricks, however because of the porosity of some lightweight blocks the mortar may “pull up” or tighten much quicker. There is generally no need to pre-wet these types of blocks.

7. Jointing Up

The process of “jointing up” is undertaken after the bricks have been laid and is important for two reasons. Firstly it influences the overall aesthetics of the building and secondly it affects the performance qualities of the mortar. An open texture is required to the surface of the joint to maximise performance as a closed surface will inhibit the permeability or breathability of the mortar. Generally, a flush joint (with the brick face) is more desirable than one that is weather struck, recessed or finished with a rounded tool.

8. Tools required

Few tools are needed for the “jointing up” process, but include; a stick (see later), phosphor bronze brush, a churn brush, and a naturally bristled or soft textured broom head/brush.

Outlined below are two processes used for producing a flush joint to brickwork. They differ little up to the point of exposing the aggregate.

Method A

1. Allow the mortar to firm up (or wait until the surface of the mortar takes on a leathery texture).
2. Compress the surface of the mortar using a hardwood stick approximately the same width of the joint (10mm) with a face cut at a 45° angle. This is also known as “rubbing up” as the stick is being pulled along the face of the joints. This action, as well as compressing/consolidating the mortar is also opening up the texture of the joint. If any holes appear in the joint fill them with mortar and repeat the process. A flat profile must be maintained on the surface of the stick otherwise the joint will become rounded (this step may be omitted if the work is very tidy).
3. Using a churn brush or naturally bristled stiff brush, beat the surface of the joint flat on (do not drag as this may lead to staining of the brickwork). This will compress/consolidate the mortar and exposes the coarser aggregate. If holes appear in the mortar, fill them and repeat the process. Loose material should fall away from the brickwork.
4. To finish the area off use a soft brush across the face of the whole wall to remove further loose material.

NOTE: If mortar gets onto the face of the brickwork brush or beat it off when it is dry. Removal whilst the mortar is wet will spread staining. Stains can be removed using a mild brick acid however; the natural weathering process will remove most stains over the winter period.

Method B

1. Allow the mortar to firm up (or wait until the surface of the mortar takes on a leathery texture).
2. Compress the surface of the mortar using a hardwood stick approximately the same width of the joint (10mm) with a face cut at a 45° angle. This is also known as “rubbing up” as the stick is being pulled along the face of the joints. This action, as well as compressing/consolidating the mortar is also opening up the texture of the joint. If any holes appear in the joint fill them with mortar and repeat the process. A flat profile must be maintained on the surface of the stick otherwise the joint will become rounded.
3. After compressing the mortar gently run a phosphor bronzer brush along the joint. This removes loose material, exposes the coarser aggregate in the mortar and cleans the arrises (phosphor bronze brushes are softer than steel wire brushes and will not leave residues that will rust and lead to staining).
4. To finish the area off use a soft brush across the face of the whole wall to remove further loose material.



8. Quality Assurance

The product constantly undergoes third party and in-house monitoring, using tested and certificated quality management systems conforming to the current international standard EN ISO 9001 and the environmental standard EN ISO 14001.

9. Health and Safety

Refer to Health and Safety datasheet.