

POINTING

1.0 MATERIALS

- 1.1 Sand: The sand shall comply with BS 1200, being clean, sharp, coarse, well-graded (good distribution between sizes) and of the correct colour and texture so that the new mortar, when it dries out, will match the original colour and texture of the desired mortar. The aggregate size is to match as closely as possible the desired mortar. The desired mortar is, unless otherwise indicated, that still visible from the original build period and based on a lime binder.
- 1.1.2 The sand shall be free of clay, silt, organic matter and excessive fines. At least half its content shall be a quartz sand. Blending from different sources may be necessary. If porous particulates or coarse brick and other dust acting as a pozzolan are specified, in the schedule of works, they should be considered as part of the aggregate mix.
- 1.1.3 In general the maximum particle size of the sand and aggregate should not exceed one half of the joint width. The following maximum sizes are a guideline:
- 10 – 12mm joints = 5mm
 - ashler work fine joints = 3mm
 - rubble walling above 12mm = 10mm

Larger, coarse aggregate in the form of galleting, tile slips or pinnings, to avoid excessively thick mortar sections or achieve a particular decorative effect should only be added if specified in the schedule of work.

Informative Only:

The void content of the sand should not be less than the volume of lime particles in the mix. A procedure to find the void percentage is as follows:

1. Take a container of known volume.
2. Take a representative sample of the selected sand and completely dry it in an oven on a tray.
3. Fill the container with the dry sand.
4. Take a measured jug of water slowly adding it to the sand until the sand is saturated (bubbles should stop rising but no water should be visible above the sand line).
5. The void percentage is calculated by:

$$\frac{\text{volume of water added}}{\text{volume of sand}} \times 100$$

If the answer is 33% then a 1 lime to 3 sand mix (by volume) will fill the voids.

- 1.1.4 Approved sands shall be stored in clearly marked bunkers and protected from inclement weather. Quantities shall be based on dry sand and accurate allowances made for bulking or other consequences of variations in moisture content.
- 1.1.5 A preference will be given for locally available sands, subject to a continuous uniformity of grading for the whole project, if samples demonstrate a good aesthetic matching with existing historic mortars.
- 1.2 Water: Water shall be clean and fresh, free from organic and harmful matter in such quantities as would adversely affect the properties of the mortar. Test as directed any water not obtained from the mains to demonstrate that it meets the requirements of BS EN 1008.
- 1.3 Lime Putty: Shall be traditionally slaked non-hydraulic lime to comply with (CL90 BS EN 459-1).
 - 1.3.1 Lump or ground non- hydraulic lime shall be properly slaked in an excess of water and hoed for at least three hours to ensure coagulation does not occur. The putty shall then be screened through gauze equivalent to a 2.36mm sieve and then be matured for not less than three months under a layer of water.
 - 1.3.2 Pre-mixed and batched lime putty may be used, from an approved source. The source should be confirmed as appropriate with the Contract Administrator.
- 1.4 Coarse Stuff: The coarse stuff of one part lime putty to three parts sand shall be batched by gauge box (or other accurate set of volume gauges to be agreed in advance the Contract Administrator). If it is mixed in a mechanical mixer only the minimum amount of water to achieve mixing shall be added.
 - 1.4.1 The coarse stuff shall be kept covered with damp sacking or polythene sheeting to prevent drying out, and stored for two weeks. Syphon or pour off excess water prior to use, tip out the mix and let it stand until all excess water has drained out.
 - 1.4.2 After storage the coarse stuff must be beaten, chopped and rammed to a stiff, plastic mix that hangs tenaciously to the trowel. A cement mixer should not be used at this stage. No extra water shall be added.
- 1.5 Hydraulic Lime: shall be Natural Hydraulic lime (NHL) in accordance with the British and European Standard, BS EN 459.
 - 1.5.1 Lime is to be from an approved source. Where a specific producer is named in the Schedule of Work, this is not to be changed without the Contract Administrator's prior consent. Colour and other physical

properties can vary, even though the lime falls in the same overall category.

- 1.5.2 The hydraulic lime powder is to be stored in dry conditions. The lime from damaged bags or those left open for more than twenty-four hours should not be used.
- 1.5.3 The lime, sand and water may be mixed in a cement mixer. Allow it to turn for approximately 15-20 minutes to improve its workability.
- 1.5.4 The mix may be left to stand for up to 24 hours (which can help improve its workability) as long as it is protected from drying out, rain, frost, etc. It must be used within the 24 hour period and must be knocked-up again if it has started to stiffen. Only a minimum of water should be added to mortars intended to be reworked. When not being used or worked the mortars should be covered and protected from environmental influences.
- 1.5.5 Up to 10% non-hydraulic lime putty may be added (by volume) to improve workability.
- 1.6 Additives: No additives of any sort shall be incorporated in the mortar except in special circumstances on the express authority of the Contract Administrator.

2.0 MORTAR

- 2.1 General: The mortar shall be more porous and permeable and no stronger than the bricks or stones.
- 2.2 Samples: Where applicable and sound existing pointing survives in good condition, the Contract Administrator will mark a section to be matched in colour, texture and strength. The necessity for anything other than a visual analysis of the existing mortar will be indicated in the Schedule of Works.
 - 2.2.1 Produce up to 9 no. mortar sample blocks (3 for each principal unit) using different combinations of lime and sand or aggregate. The mortar sample blocks are to be approximately 100mm square or diameter and the average thickness of the joints to be re-pointed. Once dry, the blocks are broken in half and the revealed edge is then examined. A written record should be kept of the mortar sample block mixes for subsequent discussion with the Contract Administrator.
 - 2.2.2 A trial area (pointing sample panel) is to be executed for approval by the Contract Administrator using the approved mortar sample block mix. This is to confirm the workmanship and finish standard and, unless otherwise indicated, is to be retained and used as an exemplar for all subsequent pointing. Amongst the issues to be confirmed by the pointing sample panel are: the finish and texture, that no laitences or inappropriate brush/tool marks are present on the surface and the

depth or fullness of the pointing. The sample panel should preferably be in a visually unobtrusive but representative location and agreed in advance with the Contract Administrator.

- 2.3 Mortar Mix: Only after the Contract Administrator has approved a sample panel shall the Contractor prepare coarse stuff. The Contractor should therefore be aware of the subsequent preparation and standing times prescribed in this Specification for the various materials.
- 2.3.1 Containers, boards, tools, etc. shall be well cleaned before the next batch of mortar is mixed/used.

3.0 PREPARATION

- 3.1 Raking Out: In preparation for repointing works, rake out all loose jointing material to a depth of not less than twice the joint width. All raking/cutting shall leave a clean, square face at the back of the joint, so as to provide optimum contact with the new mortar.
 - 3.1.1 The prepared face and joint should be carefully cleaned out with a bristle brush and thoroughly flushed out with clean water, avoiding unnecessary saturation. All dust and loose material must be removed, working from top to bottom of the wall.
 - 3.2.1 All cutting out and cleaning works should be approved prior to commencement of the repointing.
 - 3.2.2 No cleaning agents or fungicides are to be used either before or after repair works, except on the express authority of the Contract Administrator.
 - 3.2.3 Any sound pointing should be left undisturbed, even if it has weathered back behind the general wall face to as much as half the joint width. Generally, the existing mortar should be capable of being removed by raking out with a blunt instrument, leaving the arrises of the brickwork or stone unharmed. A hammer and chisel should not be used unless permitted by the Contract Administrator. Under no circumstances should an angle grinder or similar tool be used.
 - 3.2.4 Where it is desirable to remove unsightly cementitious pointing, experiments should be carried out to the approval of the Contract Administrator to ascertain the most appropriate method of removal and limit damage caused to existing work.

4.0 POINTING

- 4.1 Dampening: It is essential that the masonry is thoroughly dampened when pointing is commenced. If the joints have dried out since cleaning they must be re-wetted with a hand-held spray prior to

placing new mortar. No free water should be left lying within the prepared joint or adjacent surfaces.

- 4.2 Placement: The mortar should be pushed into the joint and firmly ironed in with the maximum possible pressure and minimum of over-working. Pointing irons should be used, not pointing trowels. The pointing irons may be cranked, bronzed or steel flat of a width which will fit into the joint and ensure compaction over the full width. Compaction is therefore achieved throughout the depth of the joint each time mortar is placed. The Contractor should be aware that it may be necessary for him to fabricate pointing irons to undertake the works.
 - 4.2.1 If the joint is to be filled in one operation, the mortar must be relatively dry, almost crumbly, and be pushed in very firmly.
 - 4.2.2 Repointing work must begin at the uppermost section of the wall and proceed downwards, ensuring that all the mortar is pressed well into the joints to achieve good compaction. Fill all the joints solidly with the approved mortar mix finishing level with the face of the masonry, but without spreading onto the arrises and in accordance with the approved sample.
- 4.3 Finish: The mortar should be left to take its initial set and then stippled with a stiff brush. The bristles should not be dragged across the face but tapped against it. This is to achieve a suitable finish and to compress any shrinking cracks. Timing is critical. If this technique is applied too early the mortar will be loosened and the bond between masonry and mortar will be disrupted. If too late, it will be difficult to make the required impression.
 - 4.3.1 Any slight fractures due to shrinkage must be cut out and re-made.
- 4.4 Protection: The work shall be protected from direct sun and rain until the face has dried and hardened.
 - 4.4.1 Protect all new work against frost, any joints damaged due to frost action should be cut out and re-done. Working in ambient temperatures below 5°C should only occur after the agreement of appropriate frost protection measures with the Contract Administrator. Where there is the risk of freezing the structure should be protected with hessian and sufficiently covered with bubble wrap or insulating material. Additional heating for the structure may also be necessary.
 - 4.4.2 During dry weather all new pointing shall be kept moist (but not wet) to ensure that the set takes place slowly. In hot weather hang damp hessian over the masonry. Avoid working in direct sunlight.
 - 4.4.3 Pointing must be kept moist for seven days at 10°C. It is recommended that a maximum and minimum thermometer is kept on-site and a daily record kept.

- 4.4.4 Turn back scaffold boards adjacent to masonry faces at night or during heavy rain.
- 4.4.5 Any mortar or stains caused by the works on the face of the masonry must be completely removed, to the satisfaction of the Contract Administrator, before the mortar hardens.