

Z21 MORTARS

To be read with Preliminaries/General conditions.

100 EXISTING MORTAR VISUAL ANALYSIS

Existing mortar appears to be

Allow a provisional sum of £500 for mortar analysis.

Approved analysts: Hirst Conservation Ltd Tel 01529 497517
 Rose of Jericho Tel 01935 83676
 National Library of Mortar Sands (Historic England) Tel 0171 973 3821

LIME:SAND MORTARS

310 MIX PROPORTIONS FOR LIME:SAND MORTARS and other particular requirements are specified elsewhere.

320 SAND FOR LIME:SAND MORTARS:

- Sharp, well graded and conforming to the methods of sampling and testing and quality requirements of BS 882 or BS 1200, unless specified otherwise.
- Selected by analysis and experimentation to achieve an overall mortar colour compatible with the existing pointing, and to the approval of the architect. Sand mixed with crushed coal aggregate if required to architects approval.

325 WATER: To be clean and uncontaminated. Source to be approved by Architect if other than mains supply.

330 READY PREPARED LIME PUTTY:

- Use lime putty slaked directly from CL 90 (high calcium) quicklime to BS 890, using an excess of water and matured in pits/containers that allow excess water to drain away.
- Density of matured lime putty: 1.3 to 1.4 kg/litre.
- Maturity of lime putty before use: Not less than _____ days after slaking.

340 POZZOLANIC ADMIXTURES FOR NONHYDRAULIC LIME:SAND MORTARS:

- Type: TBC
- Proportions: TBC
- Mix thoroughly into lime:sand mortar during knocking up stage.

345 PFA: Pulverised (low sulphur) fly ash - obtainable from Pozament Cement Ltd, Bowcliffe Hall, Bromham, Westnorthy, West Yorkshire LS23 6LP (Tel 01283 211235). Sample to be approved by Architect. 10% in volume mixed with lime putty or hydraulic lime.

346 HYDRAULIC LIME: Obtainable from Telling Lime Products, Unit 27/28 Strawberry Lane, Willenhall, West Midlands WV13 3RS (Tel 01902 366718).

350 SITE STORAGE OF LIME:SAND MORTAR MATERIALS:

- Store different sands and aggregates in different stockpiles on hard clean bases that allow free drainage.
- Store bags of hydrated hydraulic lime powder in dry conditions, raised off the ground and not touching damp surfaces. Do not use hydrated hydraulic lime affected by damp.
- Store ready prepared non-hydraulic lime putty in conditions that prevent drying out and protect from frost.
- Store non-hydraulic lime:sand mortar either on clean bases or in clean containers that allow free drainage. Keep covered to prevent drying out or wetting and protect from frost.
- Avoid intermixing and contamination between stored materials and other building materials, debris or other deleterious matter.

360 MAKING LIME:SAND MORTARS GENERALLY:

- Use operatives who are skilled and experienced in the making and use of lime:sand mortars. Provide evidence of their experience to the CA on request.

- Keep plant and banker boards clean at all times. Avoid contamination of lime:sand mortar by other materials or by any set material (including Portland cement).
- Measure materials accurately by volume using clean gauge boxes or clean undamaged buckets.
- Do not mix mortar when the air temperature is at or below 5°C and falling or below 3°C and rising.

370 SITE PREPARATION OF HYDRAULIC LIME:SAND MORTAR:

- Lime putty:
- Thoroughly mix the lime putty and sand together by compressing, beating and chopping using a roller pan mixer, or other approved mixing method. Do not add water.
- Store mortar in conditions that prevent drying out or wetting. Allow to mature for not less than _____ days before use.

380 READY-MIXED HYDRAULIC LIME:SAND MORTAR:

- Manufacturer and reference: TBC
- Ready-mixed mortar to comprise:
 - Lime putty slaked directly from quicklime to BS 890 and sand, or
 - Quicklime to BS 890 slaked directly with sand.
- Do not use hydrated non-hydraulic lime powder.
- Maturity of mortar before use to be not less than _____ days.
- Provide evidence of maturity, for each batch of mortar at time of delivery to site, to the CA on request.
- Store mortar in conditions that prevent drying out or wetting.

390 KNOCKING UP HYDRAULIC LIME:SAND MORTAR:

- When required for use, thoroughly knock up mortar to a workable consistency by compressing, beating and chopping using a roller pan mixer, or other approved mixing method. Do not add water.
- During use, prevent drying out or wetting. Retain workability by chopping and beating.

400 SITE PREPARATION OF HYDRAULIC LIME:SAND MORTAR:

- Hydraulic lime:
 - Manufacturer and reference: TBC
- Thoroughly mix hydrated hydraulic lime powder with sand, first in the dry state and then with water. Follow the lime manufacturer's recommendations for each stage of the mix. Add only sufficient water to produce a workable mix.
- Use mortar within time limits recommended by the lime manufacturer. Do not use mortar that has begun to stiffen.

410 SITE MIXED MORTAR: Mix in accordance with the workmanship requirements specified in this Work section in the proportions by volume scheduled below, appropriate to mix indent No specified in relevant Work section.

MIX PROPORTIONS: (Provisional subject to detailed mortar analysis)

SLAKED LIME

Mix 1 - General repointing and rebuilding:

2	6
Lime	Sand (3 sharp and 3 soft)

Mix 2 - Repointing coping stones and re-launching:

1.5	2	6
WPC 1	Lime	Sand (3 sharp and 3 soft)
OPC .5		

HYDRAULIC LIME

If hydraulic lime is utilised, then Telling Lime Product, Unilit 500 and B10-E are to be used in the following mix proportions:

Mix 3 - General repointing and rebuilding:

2 8
Lime Sand
(B10-E) (2 mm sharp well graded sand)

Mix 4 - Repointing coping stones and relaunching:

2 5
Lime Sand
(B10-E) (1 mm sharp well graded sand)

Mix 5 - Stone dust repairs plasterwork

1 2 1
Hydraulic Stone dust Soft silver sand
Lime

Mix 6 - Filletting mortar for render panels

2 8
Hydraulic Soft sand
Lime

Note that mix proportions are likely to vary slightly according to their situation in order to match that existing.

Note that for repointing fine ashlar joints it may be necessary to screen the coarse sand before mixing to remove the oversized aggregate.

420 MORTAR MATCHING: Match the approved original in colour, texture and detail. Mix to be weaker or more porous than surrounding masonry.

430 SAMPLES: Prepare a sample board to display:-

Samples of existing mortar and their original location.

Samples of cured proposed mortar.

Precision description of components and proportions and how the surface finish was achieved.

Allow for preparing at least 3 samples of each mix for approval by the CM, and do not proceed with repointing work, etc, until mix has been approved.

440 HANDLE: Handle, store and dispose of chemicals in accordance with the Pesticides Precautions Scheme and Health and Safety Executive recommendations and particular manufacturers recommendations.

450 PROTECTIVE CLOTHING: Wear rubber gloves, safety goggles, and respiratory masks when mixing, handling, using and disposing of chemicals.

MAKING MORTAR

460 GAUGING: Measure constituents by volume using gauge boxes made to size so that complete filling is necessary for volumes specified.

470 SAND: Proportions specified in clause Z21/M180 are for dry sand - allow bulking when wet.

480 METHODS OF MIXING: Mix by machine in accordance with 31.3 of BS 5682 : Part 3, unless a small quantity only is required.

490 ADMIXTURES:

- a) Do not use admixtures, unless approved by Architect
- b) Do not use calcium chloride.

500 MIXING: Ensure that all mortar constituents are thoroughly mixed by machine, using the minimum amount of water for the workability required.

- 510 SETTING TIME: Use mortars containing cement within two hours of mixing. Discard unused mortar.
- 520 COLD WEATHER: Do not mix mortar unless precautions are taken to ensure it has a minimum temperature of 4°C when laid.