

## MORTAR SPECIFICATION

Selection of the correct grade of mortar is an important factor in the performance of a wall. The mortar must have sufficient strength, be durable, resist rain penetration as much as possible and yet be flexible enough to accommodate slight movement within the wall.

Mortars without retarding agents should be used within approximately two hours of mixing. To restore workability within the two hour period a small amount of water may be added but should be thoroughly mixed in.

If coloured mortar is being used no re-tempering should be allowed as it may lighten the specified colour.

The working life of the mortar will be longer in colder weather and should only be prepared in batches appropriate to the planned rate of use, so that workability remains constant.

On a hot day covering the mortar can help to prevent excessive evaporation.

For all Forticrete Masonry products up to and including 25 N/mm<sup>2</sup> and all Cast Stone Dressings, designation (iii) mortar should be used. (1:1:5/6) (cement:lime:sand).

It is preferable that a cement lime sand mix be used as these mortars have increased resistance to rain penetration, have greater bond strength and will accommodate movement.

It is recommended that mortars are obtained from a reputable supplier.

Stone dust mortars, which are regularly used with natural stone masonry and dressings, can also be used with Cast Stone to add to the aesthetic appeal.

Typical mix proportions for most situations would be: White Portland Cement 1 : Hydrated Lime 1 : Portland Stone Dust 5/6.

Many projects specify silo mortars to a specific strength. The constituents of the mortar are at the producers discretion and the accommodation of stresses that the addition of lime in traditional mortar provide is lost. Problems may therefore arise if movement provision is not adequate.

### Selection of mortar

The mortar selected is to be Designed or Prescribed mortar in accordance with BS EN 998-2. Designed mortars- composition and manufacturing method is selected by the producer to achieve specified properties. They are classified by their compressive strength.

Prescribed mortars- are made in pre-determined proportions the properties of which are assumed from the stated proportions of the constituents and are classified by designations. It is difficult to state categorically that the proportions can be equated to the strength intimated in the table on the following page but it is sufficient as a guide.

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Designed mortars (Not provided to a prescribed mix) Compressive Strength Class.	Compressive strength at 28 days.	Prescribed mortars (proportions of materials by volume) not tested for strength.				
		Mortar designation.	Portland cement or Sulfate resisting Portland cement and lime, with or without air entraining additive.	Masonry cement containing Portland cement and lime in approx 1:1 ratio, and air entraining additive.	Masonry cement containing Portland cement (min 75%) and inorganic materials other than lime, and air entraining additive.	Portland cement or Sulfate resisting Portland cement and an air entraining additive.
M12	12	(i)	1:0 to ¼ :3	-	-	1:3
M6	6	(ii)	1: ½ :4 to 4 ½	1:3	1:2 ½ to 3	1:3 to 1:4
M4	4	(iii)	1:1:5 to 6	1:3 ½ to 4	1:4 to 5	1:5 to 6
M2	2	(iv)	1:2:8 to 9	1:4 ½	1:5 ½ to 6 ½	1:7 to 8

**Note 1:** the range of sand volumes noted for the mixes in this table is to allow for the effects of differences in grading on the properties of the mortar. The lower figure should be used with sands containing a higher proportion of fines.

### Mortar additives

At copings to parapets, freestanding walls, dwarf walls etc., where the risk of deterioration due to the effects of rain and frost may be severe, and where the masonry may be subjected to human activity or impact damage, the use of a mortar additive that will both increase the bond strength and improve waterproofing qualities is recommended.

### Jointing

Jointing is preferable to pointing as it leaves the bedding mortar undisturbed. Preferred profiles are bucket handle or weathered and all joints should be tooled to compact the mortar increasing weather resistance and reducing mortar shrinkage. Flush joints should be specified when using 5mm joints taking care not to smear mortar on to faces.

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### Traditional Lime Mortar

Also known as natural lime mortar, these types of mortars are made with sand using lime as the binder.

There are 2 basic types of lime for use in these mortars;

Non hydraulic limes- have a very slow setting process taking several weeks to gain a basic working strength. Its setting is dependant entirely on air and not water. It can keep for years in an airtight container or under water.

Hydraulic limes- chemically react with water to set. It must be kept stored dry to prevent setting by atmospheric moisture before use.

They can be subdivided in 3 categories, feebly hydraulic, moderately hydraulic and eminently hydraulic dependent on the relative content of impurities extracted with them from their natural deposits.

Prior to 1925 brickwork masonry was characteristically heavy, solid construction jointed with lime mortar. Wall thicknesses were frequently 2 bricks or more and never less than 215mm. Comparatively low stresses were developed in the masonry and were well within the capacity of the limited compressive strength of traditional lime mortars.

Following the 2nd World War masonry construction changed profoundly using thinner cavity walls to economise on materials. Thin walls provide less plan area to support loads and therefore higher stresses are developed. Mortars for this type need to be stronger in both compression and flexure.

Guidance on the use of traditional lime mortars is not covered in EC6 or PD6697 and they are generally used in renovation projects. However, some designers are now attracted to the environmental advantages that are claimed for lime mortar.

Hydraulic lime mortars are suitable for some modern masonry construction and are capable of producing sufficient strength and rate of setting for some thin wall brickwork applications. A few producers are offering the technical advice necessary and also producing factory batched materials making it easier for potential users to achieve successful construction.

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