Mixing Mortar for Masonry

Scope
This data sheet provides advice on mixing mortar for masonry projects. For guidance on choosing the appropriate 'salt-attack resistance' grade of masonry unit and mortar type for a project see Concrete Data 'Mortar Mixes for Masonry'.

Materials for Mortar
The simplest way to make mortar of the desired properties is to purchase pre-bagged mortar. To use this, you have only to add an appropriate amount of water and mix it in a mechanical mixer for 2 to 3 minutes. The mortar preferably should be mixed in bag-sized batches.
Alternatively, you can purchase cement, lime and sand separately.

The proportions of cement in the mortar mix differ depending on the type of cement chosen.

Cement Type GP (General purpose portland) cement, Type GB (General purpose blended) cement or Masonry cement are suitable. Masonry cement should be mixed and used in accordance with the manufacturer's recommendations. The proportions of cement in the mortar mix differ depending on the type of cement chosen.

Lime Hydrated lime or building lime. Lime is added to make the mortar 'creamier', ie more workable. Lime increases the bond of the mortar to the units whilst minimising cracking as the mortar dries out. A mortar containing lime is less brittle and has more elasticity, which also reduces the tendency to crack. It also provides the ability to the mortar to 'self heal' small cracks. All of these enhance the durability.

Pre-mixed cements Pre-mixed cements (dry mixtures of cement and lime) can be used to give mortar of the type stated on the bag if mixed with sand and water in accordance with the manufacturer's recommendations.
Sand Sand should be clean and not too fine. It should be evenly graded and free from salt and vegetable matter. The sand component accounts for the greater part of the volume of the mortar and has a direct influence on its quality. The use of ‘fatty’ sands, ie with a sizeable clay fraction, and/or the addition of ‘brickies loam’ should be avoided. The use of these materials leads to:

- low strength
- lower durability
- high shrinkage (tendency to crack)
- slower setting
- staining.

Water Mains water should be used.

Admixtures It is recommended that for ‘do-it-yourself’ projects only the following types of admixtures are used in mortars.

- Cellulose-type chemical water thickeners (only in mortars for concrete and calcium silicate masonry units); and
- Colouring pigments.

Pigments added to colour the mortar should not exceed 10% of the weight of cement in the mix and should be thoroughly mixed with the other materials prior to the addition of water.

A sample of coloured mortar should be made and allowed to completely dry before commencing work to ensure that the desired colour is achieved.

**Cement and lime should be stored off the ground in a dry environment and should be used as soon as possible.**

Storage of Materials on Site

Materials should be stored so as to prevent deterioration or contamination. Long storage periods should be avoided. Minimum requirements are:

**Cement and Lime** Store in bags off the ground in a dry environment, eg waterproof shed. Minimise air circulation around bags. Use on a 'first-in/first-out' basis. (Shelf life is in the order of 12 months.)

**Masonry units** Masonry units should be stored on pallets in the wrapping as delivered from the manufacturer. When the units are taken from the pallet they should be stacked off the ground on a clean firm surface.
Mixing

When mixing mortar it is important to carefully measure the material by volume in a suitably-sized container. Do not measure by shovelfuls, as a shovelful of cement and a shovelful of sand (usually damp) are not equal in volume.

Mortars should be used within half an hour of mixing.

Mechanical Mixing This is usually done in a concrete mixer. A small amount of mixing water is placed in the mixer followed by the sand, cement and lime. More water is then slowly added to create a thick, creamy mortar.

Each batch should be thoroughly mixed for two to three minutes to ensure that a uniform consistency is obtained.

Checklist

- Use the appropriate mix for each masonry unit type and application.
- Use the correct materials – avoid ‘fatty’ or ‘dirty’ sands.
- Use lime for better mortar performance.
- Do not use admixtures to replace lime (refer AS 3700).
- Carefully measure all ingredients (not by shovelful).
- Thoroughly mix all ingredients.

IMPORTANT Safety Information

When handling and using cement or fresh concrete, avoid skin contact. Wear suitable protective clothing.

Mortars should be used within half an hour of mixing.

Hand Mixing Mixing should be done in a clean wheelbarrow or on a mixing board to avoid contamination.

The raw materials should be combined and mixed to an even colour prior to adding water.

Water is then slowly added with the continuous turning of the mix until a thick, creamy mortar is obtained.