

Mortar Mixes for Masonry & Blockwork



Materials for Mortar and Grout

These materials are: Cement, Building Lime, Sand (Fine Aggregate), Aggregate, Water and Additives.

Cement used must be manufactured to AS 3972 (type GP or GB). Building Lime must be manufactured to AS 1672.1.

Sand used must be fine, clean and sharp, such as clean pit sand, masonry sand, or plasterer's sand. "Brickies Loam" contains clay particles that can cause high shrinkage and cracking in the mortar and should not be used for concrete masonry.

Aggregate for grout in concrete masonry must be screened aggregate or crushed rock of a size not less than 5 mm and not greater than the cover to the reinforcement, with a maximum of 20 mm.

Water must be free from any contamination. Drinking water is suitable.

The following additives are acceptable for use in mortar:

- (a) plasticizers or workability agents specifically designed for use in masonry;
- (b) methyl-cellulose-type water thickeners specifically designed and packaged for use in masonry; and
- (c) colouring pigments manufactured to British Standard EN 12878.

Detergent, beer, sweetened beverage, fine clay and plaster of paris must not be used in mortar. Additives must be used according to manufacturer's instructions. It should be noted that overdosing mortar with workability agents reduces its durability and bond strength.

Mortar

Mortar consists of a mixture of cement, sand, and sufficient water to provide a workable mix, with the addition of lime or additives (if specified). The mixes and their selection are as shown in the following Table 1 on "Mortar Mixes" and Table 2 on "Durability Requirements". For reinforced masonry, the mortar type is either M3 or M4. Mortars classified as M1 are used for restoration applications only.

Table 1 – Mortar Mixes

Mortar class	Mix proportions by volume				Mortar suitability		
	Cement (GB/GP)	Building lime	Sand	Water thickener	Fired clay	Concrete	Calcium silicate
M2	1	2	9	No	✓	×	×
M3	1	1	6	Optional	✓	✓	×
	1	0	5	Yes	✓	✓	✓
M4	1	0.5	4.5	Optional	✓	✓	×
	1	0	4	Yes	✓	✓	✓
	1	0-0.25	3	Optional	✓	✓	×

✓ satisfactory
 × unsatisfactory

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The above is intended to provide general information in summary form. The contents do not constitute specific advice and should not be relied upon as such. Formal specific advice should be sought by members with respect to particular matters before taking action. ABN 99 004 631 752

Table 2 – Durability Requirements

Exposure environment (See Clause 12.2.8)	Masonry units	Mortar	Minimum durability classification of built-in components	Minimum cover to reinforcement in grouted cavities or cores (mm)
	Minimum salt attack resistance grade	Minimum classification		
1 Elements in mild environments	Protected	M2	R0	5
2 Elements in interior environments that are—				
(a) above a damp-proof course and enclosed within a building except during construction;	Protected	M2	R1	5
(b) subject to non-saline wetting and drying;	General purpose	M3	R3	15
(c) subject to saline wetting and drying.	Exposure	M4	R4	20
3 Elements above the damp-proof course in non-marine exterior environments. Elements above the damp-proof course in other exterior environments, with a waterproof coating, properly flashed junctions with other building elements and a top covering (roof or coping) protecting the masonry.	Protected	M2	R1	5
4 Elements below damp-proof course or in contact with the ground that are—				
(a) protected from water ingress by an impermeable membrane;	Protected	M2	R2	5
(b) in non-aggressive soils;	General purpose	M3	R3	15
(c) in aggressive soils.	Exposure	M4	R4	20
5 Elements in marine environments	General purpose	M3	R3	15
6 Elements in severe marine environments	Exposure	M4	R4	30
7 Elements in—				
(a) fresh water;	General purpose	M3	R3	20
(b) saline or contaminated water including tidal and splash zones.	Exposure	M4	R5	30
8 Elements within 1 km of an industry in which chemical pollutants are produced	Exposure	M4	R5	30

Note: Minimum durability classification of built-in components, such as wall ties and lintels, are identified with the “R” classification which is generally marked on the packaging or the product.

Exposure Environments:

Mild environment: Environments remote from the coast, industrial activity, and the tropics.

Exterior environment: The exposed leaf of an external cavity or masonry veneer wall and the cavity space.

Interior environment: All internal leaves including the internal leaf of a cavity wall.

Marine environment: From 100 m to 1 Km from a non-surf coast and from 1 Km to 10 Km from a surf coast.

Severe marine environment: Up to 100 m from a non-surf coast and up to 1 Km from a surf coast.

For further information:

HIA members can contact HIA's Building Services staff on 1300 650 620 or email hia_technical@hia.com.au.