

Factory produced mortar for external rendering



General Information

The type of mortar used for rendering will depend on the background, type of wall and the exposure of the building. The information given in this data sheet applies to both traditional and coloured renderings.

Two coat work, an undercoat and finishing coat is generally required. In conditions of severe exposure three coat work is recommended, with the first coat relatively impervious to water and the others more porous.

Composition and Manufacture

Mortar Industry Association members' external rendering mortars are manufactured from carefully selected clean sand (now known as fine aggregate) conforming to BS EN 13139, cements conforming BS EN 197-1, admixtures to BS EN 934-3 and when incorporated, lime to BS EN 459-1. Rendering mixes conforming to BS EN 998-1 when tested according to the methods given in BS EN 1015 and BS 4551 are available. If required, pigments conforming to BS EN 12878 can be accurately added at the factory to produce an extensive range of colours and shades. External rendering mortars can be supplied either ready-to-use or gauged with cement on site in any mix ratio specified. The table below shows the mortar designation, the amount of cement to be added on site and the resultant traditional mix. As will be seen later in this data sheet, the volume of cement added on site may be varied to produce a larger range of mortars.

Table 1: Mix designation and cement gauging

Traditional mortar designation	Mortar by volume Cement:lime:sand	Factory produced by volume lime:sand	Site mixing Cement:factory produced			
			By volume	Lime:sand by weight kg:tonne		
				Air entrained	Non air entrained	Cement:sand Mortar
i	1:1/4:3	1:12	1:3	-	250	1:3
ii	1:1/2:4 - 4 1/2	1:9	1:4 1/2	190	170	1:4 1/2
iii	1:1:5 - 6	1:6	1:6	150	125	1:6
iv	1:2:8 - 9	1:4 1/2	1:9	100	90	1:9

Note: Cement:sand mortar supplied ready-to-use only

Fire resistance and combustibility

Rendering mortar is non-combustible according to the definition in BS EN 13501-1. A rendering contributes to the fire resistance of a wall but no separate value for that of the rendering can be given.

Properties

In respect of fresh properties the manufacturer is required to declare the workable life and, where relevant, the chloride content and air content.

For hardened properties MIA data sheet no. 19 provides further guidance.

Table 2: Bulk density, volume yield and coverage

Bulk density of factory produced mortars		Lime:sand	Cement:sand
Without air entrainment		1850 – 2000 kg/m ³	1700 - 1850 kg/m ³
With air entrainment		1700 – 1850 kg/m ³	
Volume yield		1 tonne of factory produced lime:sand for mortar when mixed with Portland cement on site will yield 0.65 to 0.73m ³	
Coverage	Thickness (mm)	Area (m ²) per tonne 1:6	Area (m ²) per m ³
	5	90 to 100	200
	10	45 to 50	100
	15	33 to 37	66
	20	29 to 33	50

Durability

Details of the designations of mortar required for various exposure aspects are given opposite. In areas where atmospheric pollution is high, a designation ii is recommended to reduce the rate of accumulation of dirt or other matter deposited from polluted atmosphere upon the surface of a rendering. A mortar no weaker than designation iii should be used where resistance to mechanical abrasion is required.

For coloured renderings better appearance is obtained when rough textured surfaces are used, such finishes also have better weathering characteristics.

Working Characteristics

Factory produced mortars have good workability and plasticity, a high degree of cohesiveness, spread easily under the float, thus increasing productivity and minimising wastage by droppings. They are eminently suitable for use with mechanical spraying equipment. The setting rate of factory produced mortars allows time for tooling, or scratching the surface after setting. This characteristic makes coloured factory produced mortars suitable for sgraffito mural work.

For guidance on working in low/freezing temperatures, see data sheet no. 7.

Undercoat

The undercoat should be weaker in strength than the background material, but stronger than the finishing rendering. The designation of mortar to be used is given in the Table opposite.

The undercoat, 10-12mm thick, should be horizontally scratched and allowed to dry out thoroughly before applying the second coat, thus allowing any potential shrinkage to occur. If possible, allow at least two days in summer and a week or more in cold or wet weather. When the undercoat has dried thoroughly the surface may need damping down before applying the finish.

Finishing coat

There are numerous types of finishes for rendering such as **pebble dash**, **roughcast**, **Tyrolean**, **smooth floated** and **scraped textured**. Details of these finishes can be found in other publications and only details of the mortars are given here. For coloured renderings only the finishing coat need contain pigment. The average thickness of finishing coats should be about 8-10mm and they should never exceed the thickness of the undercoat.

Details of backgrounds

The type of background and its condition will have a great effect on the durability and bond of the rendering.

Table 3: Factory produced lime:sand mortars

Type of background		Severe	Type of exposure	
				Moderate
Weak, aerated concrete	Undercoat Finishing	iii gauged 1:6 iii gauged 1:7	iv gauged 1:8 iv gauged 1:9	iv gauged 1:8 iv gauged 1:9
Normal brickwork	Undercoat Finishing	iii gauged 1:5 iii gauged 1:6	iii gauged 1:6 iii gauged 1:7	iii gauged 1:8 iii gauged 1:9
No-fines concrete	Undercoat Finishing	iii gauged 1:4 iii gauged 1:5	iii gauged 1:5 iii gauged 1:6	iii gauged 1:5 iii gauged 1:6
Metal lathing	Undercoat Finishing	iii gauged 1:4 iii gauged 1:5	iii gauged 1:4 iii gauged 1:5	iii gauged 1:5 iii gauged 1:6
Dense brick, concrete	Undercoat Finishing	Spatterdash of 1 cement:2 to 3 sharp sand followed by iii gauged 1:5 iii gauged 1:6		

Table 4: Factory produced ready-to-use & silo mortars

Type of background		Severe	Type of exposure	
				Moderate
Weak, aerated concrete	Undercoat Finishing	1:1:6, 1:6 1:1:7, 1:7	1:2:8 or 1:8 1:2:9 or 1:9	1:2:8 or 1:8 1:2:9 or 1:9
Normal brickwork	Undercoat Finishing	1:1/2:4 1/2, 1:5 1:1:6, 1:6	1:1:6 or 1:6 1:7:8 or 1:8	1:2:8 or 1:8 1:2:9 or 1:9
No-fines concrete	Undercoat Finishing	1 1/2:4 1/2, 1:4 1:1:6, 1:5	1:1:5 or 1:5 1:1:6 or 1:6	1:1:5 or 1:5 1:1:6 or 1:6
Metal lathing	Undercoat Finishing	1:1/4:3, 1:3 1:1/2:4 1/2, 1:4 1/2	1:1/2:4 or 1:4 1:1/2:4 1/2 or 1:4 1/2	1:1:5 or 1:5 1:1:6 or 1:6
Dense brick, concrete	Undercoat Finishing	Spatterdash of 1 cement:2 to 3 coarse sand Followed by 1:1/2:4 1/2 or 1:4 1/2		

Brickwork - It is desirable to have the joints raked and this becomes essential where the bricks are of a dense impermeable type.

Old work - Whether brick, block or concrete it should be thoroughly wire brushed and washed down. In the case of concrete it may be necessary to provide a mechanical key by bush-hammering and a bonding coat of cement:sand spatterdash.

Moderately weak and porous materials - With backgrounds such as lightweight concrete or bricks of low strength, a mortar of high water retentivity and weaker in strength than the background should be used.

No-fines concrete - A thin coat should be applied to blind and level the surface followed by the finishing coat.

Metal lathing - Should there be a risk of rusting, stainless steel or galvanised metal lathing should be used. If the background contains some types of **soluble salts** and is liable to become damp the salts may react with the cement in the rendering and failure may occur. In such circumstances the recommendations given in BRE Digest 362 should be consulted.

Maintenance

If proper attention has been given to external details in designing the structure and the rendering materials and methods of application are in accordance with the recommendations of BS 5262, external rendered finishes should not require any maintenance over a long period of years.

Rendered finishes may be cleaned by washing down with water applied through a fine jet at mains pressure. Any cracks and damaged areas should be repaired before cleaning.

References

BS EN 197-1	Cement composition, specification and conformity criteria for common cements
BS EN 459-1	Building lime. Definitions, specifications and conformity criteria
BS EN 934-2	Concrete admixtures - Definitions, requirements, conformity, marking and labelling
BS EN 934-3	Admixtures for masonry mortar - Definitions, requirements, conformity, marking and labelling
BS EN 998-1	Specification for mortar for masonry - Part 1: Rendering and plastering mortar
BS EN 1015	Methods of test for mortar for masonry
BS EN 12878	Pigments for the colouring of building materials based on cement and/or lime. Specifications and methods of test
BS EN 13139	Aggregates for mortar
BS EN 13501-1	Fire classification of construction products and building elements - Part 1: Classification using test data from reaction to fire tests
BS 4551	Methods of testing mortars, screeds and plasters
BS 5262	Code of practice for external renderings
PD 6678	Guide to the selection and specification of mortar
PD 6682-3	Aggregates for mortar - Guidance on the use of BS EN 13139
Digest 362	Building Mortar - BRE publication

British Standards are currently being revised in line with European requirements. The new standards are at varying stages of preparation and/or publication, for a full list of British and new European Standards see the MIA data sheet of technical references.



There is a real danger of contact dermatitis or serious burns if skin comes into contact with wet mortar. Wear suitable protective clothing and eye protection. Where skin contact occurs either directly or through saturated clothing wash immediately with soap and water. For eye contact immediately wash out eyes thoroughly with clean water. If swallowed wash out mouth and drink plenty of water.

The relevant codes of practice, standards and statutory regulations must always be observed.

The information in this data sheet may be freely copied with acknowledgement to the Mortar Industry Association. Current issue numbers of all MIA publications are available from the MIA website.



Mortar Industry Association

Gillingham House 38 - 44 Gillingham Street London SW1V 1HU Tel +44 (0)20 7963 8000 Fax +44 (0)20 7963 8001

Promoting quality factory produced mortar

www.mortar.org.uk