

# Factory produced silo mortar for masonry



## General Information

Factory produced silo mortars offer a range of mix proportions and overcome many potential problems relating to site mixing.

The silo is delivered to site complete with integral mixer. Once power and water supplies are connected, mortar can be produced as required. The rate at which water is added can be controlled to achieve the required consistency.

### Two-Compartment Silo

These are transportable silos with two sealed compartments which are filled by the producer with the required amounts of sand (now known as fine aggregate) and cement. The mixing ratio is calibrated before delivery to ensure mix proportions are to the customer's requirements.

Liquid admixtures and pigment may be added to the mixer by means of a metered pump.

### Single Compartment Silo

This is a single compartment transportable silo that is filled by the producer with dried sands, cement, lime if required and other admixtures, pigments or additives premixed to the customer's requirements.

## Composition and Manufacture

Mortar Industry Association members manufacture their mortars from carefully selected clean sand (now known as fine aggregate) conforming to the requirements of BS EN 13139, cements conforming BS EN 197-1, admixtures to BS EN 934-3 and when incorporated, lime to BS EN 459-1. If required, pigments conforming to BS EN 12878 can be accurately added at the factory to produce an extensive range of colours and shades. The following table gives the mix designation, compressive strength (BS EN 998-2 mortar class) and composition.

**Table 1: Mix designation, compressive strength and composition**

Traditional mortar designation	BS EN 998-2 mortar class	Nominal proportions by volume		Mass of original dry materials	
		Cement:lime:sand	Cement:sand	Cement%	Lime%
i	12	1:1/4:3 -	- 1:3	20.0 - 25.0 20.5 - 25.0	1.0 - 3.0 Nil
ii	6	1:1/2:4 - 4 1/2 -	- 1:3 - 4	14.0 - 19.0 16.0 - 25.0	1.5 - 4.5 Nil
iii	4	1:1:5 - 6 -	- 1:5 - 6	11.0 - 15.5 11.5 - 16.5	3.0 - 7.0 Nil
iv	2	1:2:8 - 9 -	- 1:7 - 8	7.5 - 10.0 8.5 - 12.5	4.0 - 8.5 Nil

**NB** Mortar class (compressive strength) as defined in the National Annex to BS EN 998-2:2003, clause NA.1

## 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 the hardened properties of design masonry mortars the compressive strength shall be declared and where relevant the bond strength, water absorption and density. In addition the water vapour permeability and thermal conductivity are required to be declared by reference to tabulated values.

For prescribed mortars the mix proportions by volume or by weight of all the constituents shall be declared by the manufacturer. In addition, the compressive strength shall be declared with reference to clause NA1 of the National Annex to BS EN 998-2:2003 and PD 6678.

## Selection of Mortar Mix

The mortar should be selected by reference to the British Standard Code of Practice for Use of Masonry BS 5628.

## Durability

Factory produced silo mortars are of guaranteed composition, thoroughly mixed and will therefore provide satisfactory durability. However, this does not negate the designer's responsibility to specify the correct mortar designation for the type of structure, exposure conditions and type of masonry units. Neither does it relieve the builder of his responsibility to ensure that operatives use good site practice. Recommendations for site practice given in other data sheets in this series and the manufacturers' technical literature must be followed.

## Working Characteristics

In hot conditions some stiffening may occur which may be corrected by the addition of a small amount of water followed by trowel mixing on the spot board in the traditional manner. Once the initial set has started the mortar must not be reconstituted in a mechanical mixer or by any other method.

The setting of cement is affected by weather and will proceed more slowly when it is colder.

This factor is taken into account when the mortars are manufactured but subsequent significant reductions in temperature may increase the retardation period and extend the working life and will have no adverse effect on the masonry.

It is inadvisable to proceed with the construction of masonry whilst the temperature is below 3°C and falling. If the mortar freezes any frozen material or crust should be discarded.

The unfrozen mortar may then be used providing that the air temperature is suitable and the bricks and blocks are not saturated or frozen.

## Protective Measures

All mortar should be protected against excessive rain or drying conditions.

All newly erected masonry should be covered at the end of a working day or when rained off.

No further measures are required in respect of factory produced mortars beyond those recognised as being good site practice.

## Maintenance

Generally, factory produced mortars require the minimum of maintenance.

## 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 998-2	Specification for mortar for masonry - Part 2: Masonry 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 4027	Specification for sulfate-resisting Portland cement
BS 4551	Methods of testing mortars, screeds and plasters
BS 5224	Specification for masonry cement
BS 5628	Code of practice for use of masonry
PD 6678	Guide to the selection and specification of masonry mortar
PD 6682-3	Aggregates for mortar - Guidance on the use of BS EN 13139

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

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[www.mortar.org.uk](http://www.mortar.org.uk)