

CI/SfB | Yq4 |
 Issue 10 October 2023
 (SUPERSEDES Issue 9 September 2021)

General Information



Factory produced lime:sand is a blend of sand and lime to which cement is added on site, to produce masonry mortars that can have a range of desired strengths and performance characteristics pre-determined by the specifier or user (For more information, see Data Sheet 18).

Factory produced lime:sand mortar for masonry

Composition and Manufacture

MPA Mortar members manufacture their lime:sand products from carefully selected clean sand (now known as fine aggregate) conforming to BS EN 13139 with lime conforming to BS EN 459-1. Correctly gauged mortar mixes conform to BS EN 998-2, when tested by the methods given in BS EN 1015 and BS 4551. 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 mortars are generally delivered in bulk, with skips or bags also available. The table below shows mix

designations and the amount of cement to be added on site.

When mixing, it is important that the designation of the mortar is correct for the type of work and that if coloured mortar is being used, it is the agreed shade. With coloured mortars, it is recommended that a small trial panel be constructed to ensure that the interaction of the texture and colour of the bricks on the mortar will produce the desired effect.

Table 1: Mix designation and cement gauging

Mortar designation	Mortar by volume Cement:lime:sand	Factory produced by volume lime:sand	Site mixing Cement: factory produced lime:sand By volume	Mortar class that may be assumed	Suitable for use in environmental condition
i	1:1/4:3	1:12	1:3	M12	Severe (S)
ii	1:1/2:4 - 4 1/2	1:9	1:4 1/2	M6	Severe (S)
iii	1:1:5 - 6	1:6	1:6	M4	Moderate (M)
iv	1:2:8 - 9	1:4 1/2	1:9	M2	Passive (P)

When the sand portion is given as, for example, 5 to 6, the lower figure should be used with sands containing a higher proportion of fines, whilst the higher figure should be used with sands containing a lower proportion of fines.

Cements in accordance with NA. 1.3 (except masonry cements), or combinations in accordance with NA.1.4.

Mortar mixes conform to BS EN 998-2, when tested by the methods given in BS EN 1015 and BS 4551.

NB Mortar class/designation as defined in the National Annex to BS EN 998-2, clause NA-1.

Properties

These mortars used in accordance with EN 1996-1-1 Eurocode 6 are suitable for all types of masonry applications, particularly housing and other medium and low rise structures. Brickwork and blockwork constructed with these mortars will retain a degree of elasticity so that the inevitable movement of buildings during and after construction can be accommodated with minimal cracking, which is both unsightly and a cause of remedial costs.

Coverage

1 tonne of cement:lime:sand mortar will lay approximately 1000 bricks or 600 blocks of nominal size 450 x 225 x 100mm.

Durability

Masonry mortars made with cement and factory produced lime:sand help to produce a durable weatherproof and frost resistant joint through which rain will not easily penetrate. Cracking is minimal, but any that does occur tends to be minor and self-healing due to the combined effects of moisture and carbon dioxide in the atmosphere. The action of these will, by slow carbonation, tend to fill and seal minor cracks through autogenous healing (See MPA Mortar Data Sheet 18).

Working characteristics

Mortars made with cement and factory produced lime:sand have good plasticity and workability. They can help to completely fill the vertical as well as the horizontal joints in masonry, assisting with the attainment of good quality workmanship. The mortar, whilst possessing a high degree of cohesiveness that helps to reduce wastage due to dropping, spreads easily under the trowel, thus increasing productivity and reducing mason fatigue.

The mortars have high water retentivity enabling the mortar to resist the suction of the bricks, blocks or tiles and remain workable while laying is carried out. This helps to ensure good bond and reduces the need to re-temper.

It is recommended that deliveries of factory produced lime:sand for mortar should be

tipped, unless delivered in skips, onto a clean area with a sealed base, slab or similar prepared area and sheeted when not in use. Sheeting is most important when colour is a requirement, as rain and weathering may otherwise cause separation of some of the fine material.

To obtain the final mortar mix, considerable care should be taken on site to add the correct amount and type of cement. Gauge boxes or other accurate measuring vessels should be used when proportioning is by volume. When using coloured mortars, it is strongly advised that the same brand, type and source of cement is used throughout the contract.

For the volume and type of cement for the various designations of mortar refer to BSEN 998-2 for full details and from where the majority of Table 1 information originates.

Ensure that only clean water is used for making mortars and adjust the quantity carefully to obtain the desired and appropriate consistency for the work.

Stacked bricks, blocks and tiles should be protected from the weather. They should not be used when saturated with water or when frozen as this can lead to disfiguration of the masonry and therefore the building and in winter, may lead to attack on the masonry by frost. In summer, protection from sunshine should be in place to prevent the bricks, blocks or tiles from being hot and causing rapid moisture loss from the mortar after laying.

New work should be protected in accordance with good working practice at the end of the working day or when work is interrupted by adverse weather. Scaffold planks placed along the top of walls give at least some protection from saturation by rain. Ideally, the tops of unfinished work should be properly covered; this is especially important with cavity walls and where perforated bricks are used. Protection from drying sunshine and wind should also be carried out to allow the mortar to cure appropriately.

Although cement:lime:sand mortars should be used within the 1-2 hours workable life, most will remain relatively soft for a typical working day, making cleaning up at the end of each shift reasonably easy. All mixers, spot boards and trowels, etc., should be cleaned at the end of each shift or when changing the colour of the mortar.

Recommended Mortar Mixes for Various Conditions

Reference should be made to British Standard BS EN 1996-1-1 having regard to the requirements for strength durability and appearance.

Maintenance

Generally, walls constructed with mortars containing lime minimises the maintenance requirements. See MPA Mortar Data Sheet 18.

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 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 4551	Methods of testing mortars, screeds and plasters
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
EN 1996-1-1	Eurocode 6: Design of masonry structures. General rules for reinforced and unreinforced masonry structures. + National Annex.
Lime in Mortars	Hydrated Lime – benefits of use in mortars EuLA & Lucideon publication 2015

All references to British and/or European standards should refer to the current published edition. For a comprehensive list of British and European Standards see the MPA Mortar data sheet of technical references.



MPA Mortar is part of the Mineral Products Association, the trade association for the aggregates, asphalt, cement, concrete, dimension stone, lime, mortar and industrial sand industries.

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Factory produced mortar products will contain either cement or lime, both of which have properties which are hazardous to health. Please refer to the manufacturers or suppliers Material Safety Data Sheet for the specific product/grade to find more information on the nature of the hazardous properties, the risks and health effects of exposure and the recommended safe use and handling procedures.