Factory produced lime:sand mortar for masonry

Composition and Manufacture

Mortar Industry Association 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.

Table 1: Mix designation and cement gauging

<table>
<thead>
<tr>
<th>Mortar designation</th>
<th>Mortar by volume Cement:lime:sand</th>
<th>Factory produced by volume lime:sand</th>
<th>Site mixing Cement: factory produced lime:sand</th>
<th>Mortar class that may be assumed</th>
<th>Suitable for use in environmental condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>i</td>
<td>1:4:3</td>
<td>1.12</td>
<td>1.3</td>
<td>M12</td>
<td>Severe (S)</td>
</tr>
<tr>
<td>ii</td>
<td>1:4:4 - 4:6</td>
<td>1.9</td>
<td>1.4:6</td>
<td>M6</td>
<td>Severe (S)</td>
</tr>
<tr>
<td>iii</td>
<td>1:5 - 6</td>
<td>1.6</td>
<td>1.6</td>
<td>M4</td>
<td>Moderate (M)</td>
</tr>
<tr>
<td>iv</td>
<td>1:9 - 12</td>
<td>1.4:6</td>
<td>1.9</td>
<td>M2</td>
<td>Passive (P)</td>
</tr>
</tbody>
</table>

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.
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 MIA 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 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. Sheetig 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 MIA data Sheet 18.
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.

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