Table 2.6 Requirements for mortar (BS 5628)

Mortar designation	*Types of mortar (proportion by volume)*			*Mean compressive strength at 28 days* (N/mm^2)	
	Cement:lime: sand	*Masonry cement: sand*	*Cement: sand with plasticizer*	*Preliminary (laboratory) test*	*Site tests*
(i)	1:0 to $\frac{1}{4}$:3	–	–	16.0	11.0
(ii)	1: $\frac{1}{2}$:4 to $4\frac{1}{2}$	1:$2\frac{1}{2}$ to $3\frac{1}{2}$	1:3 to 4	6.5	4.5
(iii)	1:1:5 to 6	1:4 to 5	1:5 to 6	3.6	2.5
(iv)	1:2:8 to 9	1:$5\frac{1}{2}$ to $6\frac{1}{2}$	1:7 to 8	1.5	1.0

↑ Increasing strength | ↓ Increasing ability to accommodate movement, e.g. due to settlement, temperature and moisture changes

Increasing resistance to frost attack during construction →

Improvement in bond and consequent resistance to rain penetration ←

Direction of change in properties is shown by the arrows

- Proper development of bond with the brick.
- Resistance to cracking and rain penetration.
- Resistance to frost and chemical attack, e.g. by soluble sulphate.
- Immediate and long-term appearance.

2.3.2 Cement

The various types of cement used for mortar are as follows.

(a) Portland cement

Ordinary Portland cement and rapid-hardening cement should conform to a standard such as BS 12. Rapid-hardening cement may be used instead of ordinary Portland cement where higher early strength is required; otherwise its properties are similar. Sulphate-resistant cement should be used in situations where the brickwork is expected to remain wet for prolonged periods or where it is susceptible to sulphate attack, e.g. in brickwork in contact with sulphate-bearing soil.

(b) Masonry cement

This is a mixture of approximately 75% ordinary Portland cement, an inert mineral filler and an air-entraining agent. The mineral filler is used to reduce the cement content, and the air-entraining agent is added to improve the workability. Mortar made from masonry cement will have lower strength compared to a normal cement mortar of similar mix. The other properties of the mortar made from the masonry cement are intermediate between cement:lime:sand mortar and plasticized cement:sand mortar.

2.4 LIME: NON-HYDRAULIC OR SEMI-HYDRAULIC LIME

Lime is added to cement mortar to improve the workability, water retention and bonding properties. The water retentivity property of lime is particularly important in situations where dry bricks might remove a considerable amount of water from the mortar, thus leaving less than required for the hydration of the cement. Two types of lime are used, non-hydraulic or semi-hydraulic, as one of the constituents of mortar for brickwork. These limes are differentiated by the process whereby they harden and develop their strengths. Non-hydraulic lime initially stiffens because of loss of water by evaporation or suction by bricks, and eventually hardens because of slow carbonation, i.e. absorption of carbon dioxide from the air to change calcium hydroxide to calcium carbonate. Semi-hydraulic lime will harden in wet conditions as a result of the presence of small quantities of compounds of silica and alumina. It