

Template for comments and secretariat observations

Date:	Document:	Project:
-------	-----------	----------

MB/ NC ¹	Line number (e.g. 17)	Clause/ Subclause (e.g. 3.1)	Paragraph/ Figure/ Table/ (e.g. Table 1)	Type of comment ²	Comments	Proposed change	Observations of the secretariat
		3.1.1. mortar		Ed	Wording unclear	a plastic material, traditionally composed of one or more inorganic binders, aggregates, and water, and sometimes containing additives and admixtures, used in construction for bedding, jointing, bonding and surface finishing of masonry units, which subsequently sets to form a stiff material	
		3.1.3. Aggregate		Te/ed	Not capitalised in English Some types of aggregate omitted	aggregate particles of naturally occurring or artificially crushed stone, ash or slag, with a range of particle sizes, used as the filler in the mortar (see also Sand) Note 1 to entry: Apart from rock, ash and slag aggregates, light-weight aggregates, such as expanded clay, vermiculite, perlite, also exist.	
		3.1.4 Additive		Ed	Not capitalised in English This definition has been confused with that of 'admixture' In the current industry, additives include hair, pozzolans etc	additive substance other than binder, aggregate or water, added to mortar to alter its properties. Pigments, pozzolans and fibrous substances are additives.	
		3.1.5 Admixture		Ed	Not capitalised in English This definition has been confused with that of 'additive' In the current industry, admixtures are taken to mean things added in small quantities such as plasticisers, air-entrainers	admixture Organic or inorganic material added to mortar in small quantities (often no more than 1 % w/w) to modify the properties of the mortar in the fresh or hardened state (for example set-accelerators, plasticizers and air-entraining agents)	
		3.1.6 Mix		Ed	Not capitalised in English	mix	
		3.1.8 setting		Ed/Te	Wording unclear and some info omitted	process through which the mortar changes from a workable plastic state to an unworkable stiffer state, accompanied by a slight increase in with very slight measurable strength (the first stage of 'hardening').	

1 **MB** = Member body / **NC** = National Committee (enter the ISO 3166 two-letter country code, e.g. CN for China; comments from the ISO/CS editing unit are identified by **)

2 **Type of comment:** **ge** = general **te** = technical **ed** = editorial

Template for comments and secretariat observations

Date:	Document:	Project:
-------	-----------	----------

MB/ NC ¹	Line number (e.g. 17)	Clause/ Subclause (e.g. 3.1)	Paragraph/ Figure/ Table/ (e.g. Table 1)	Type of comment ²	Comments	Proposed change	Observations of the secretariat
		3.1.10 Hardening		Te/Ed	Not capitalised in English Explanation incorrect	hardening strength development that accompanies and continues after the initial setting of the mortar.	
		3.1.11 curing		Te	Explanation is somewhat limited – could be expanded slightly	process by which mortars develop strength due to carbonation and hydration. The process is controlled by environmental conditions and/or protective measures.	
		3.2.2 pointing mortar		Ed	Badly worded	mortar used to fill the outer part of an existing mortar joint (usually not greater than one-third of the total depth of the joint) NOTE 1 to entry Fresh, plastic bedding mortar may be removed (raked out) from the outer part of the joint and replaced with pointing mortar, or the outer part of a hardened mortar joint may be removed and replaced with a pointing mortar (repointing).	
		3.2.3 repair mortar		Te	'artificial' is unclear	mortar replacing damaged mortar in existing masonry. Repair mortars are also used for patching damaged stone	
		3.2.5 Plaster		Ed, Te	Not capitalised in English Further detail needed	plaster mix of one or more inorganic binders, aggregates, water and any admixtures used as a coating on <i>internal</i> ceilings and walls of masonry or flexible support (such as timber laths) NOTE 1 to entry Plaster is a traditional English term	
		3.2.6 rendering mortar render		Te	Further detail needed	mix of one or more inorganic binders, aggregates, water and any admixtures used as a coating on <i>external</i> walls of masonry or timber laths	

1 **MB** = Member body / **NC** = National Committee (enter the ISO 3166 two-letter country code, e.g. CN for China; comments from the ISO/CS editing unit are identified by **)

2 **Type of comment:** **ge** = general **te** = technical **ed** = editorial

Template for comments and secretariat observations

Date:	Document:	Project:
-------	-----------	----------

MB/ NC ¹	Line number (e.g. 17)	Clause/ Subclause (e.g. 3.1)	Paragraph/ Figure/ Table/ (e.g. Table 1)	Type of comment ²	Comments	Proposed change	Observations of the secretariat
		3.2.7 stucco		Te, Ed	Further detail needed	An imprecise term in English, derived from the Italian word for 'plaster', with no specific material connotations. It may refer equally to exterior or interior plaster, based on lime or another binder, and may describe both decorative mouldings and flat work. In the UK, historically it has meant different things at different times, but is often associated with Regency and early Victorian exteriors.	
		3.2.8 roman concrete		Te, Ed	Capitalised in English Poorly worded	Roman concrete composite material originating in the Roman empire that consists of lime mixed with pozzolanic material, either natural (e.g. volcanic tuff, pumice, ...) or artificial (e.g. crushed bricks or pottery), and fine and coarse aggregates. The material was placed within a formwork where it hardened with little air, and was also able to set in wet conditions depending on its hydraulicity.	
		3.2.10 fine stuff			Tech – can also be made with crushed stone and other aggregates. Usually used just for top coats of plaster or render. In the UK, for plastering it is usually referred to as 'setting stuff'	Mortar made of lime and fine aggregate, used for pointing finely-jointed ashlar and for the finishing coat in plastering and rendering. Note: In the UK, when used for the finishing coat of internal plaster it is usually called 'setting stuff'.	
		3.3.1 Gypsum		Ed/Te	Not capitalised in English Definition rather inadequate	gypsum material composed of calcium sulphate in its various hydration phases. The raw material, calcium sulphate dihydrate (CaSO ₄ .2H ₂ O) is calcined at between 150 and 160°C, to form calcium sulphate hemihydrate (CaSO ₄ . ½H ₂ O) which, after the addition of water, is able to set and harden, forming calcium sulphate dihydrate (CaSO ₄ .2H ₂ O). Used as a binder in plaster mortars and as a set retarder in Portland cement.	

1 **MB** = Member body / **NC** = National Committee (enter the ISO 3166 two-letter country code, e.g. CN for China; comments from the ISO/CS editing unit are identified by **)

2 **Type of comment:** **ge** = general **te** = technical **ed** = editorial

Template for comments and secretariat observations

Date:	Document:	Project:
-------	-----------	----------

MB/ NC	Line number (e.g. 17)	Clause/ Subclause (e.g. 3.1)	Paragraph/ Figure/ Table/ (e.g. Table 1)	Type of comment ²	Comments	Proposed change	Observations of the secretariat
		3.3.2 lime (General)		Ed		material composed of oxides (quicklime) or hydroxides (hydrated or slaked lime) of calcium or calcium and magnesium used as binder in traditional mortar or paint (for example limewash). It is produced by calcination or burning of limestone, to produce the material usually known as "quicklime"	
		3.3.3 quicklime		Ed	Clarity – insert brackets	product of the calcination of limestone (at approx. 900° C). Composed of mainly calcium oxide (CaO) or calcium oxide in combination with magnesium oxide (MgO)	
		3.3.4 slaked lime		Te/Ed	Incorrect – slaking or hydration may be carried out with exactly the right amount of water to hydrate the lime (producing a powder rather than a putty). When an excess of water is used a putty is produced. Clarity – add brackets	calcium hydroxide (Ca(OH) ₂) prepared by hydrating (or slaking) quicklime (CaO) with water to produce a powder or putty.	
		3.3.5 lime putty		Ed/Te	Clarification – italicise 'exceeds' to stress the difference between this and the definition of slaked lime The information on the exothermic nature of hydration would be better included in 3.4.2 Slaking	plastic material resulting from slaking quicklime with an amount of water that <i>exceeds</i> the stoichiometric requirement NOTE 1 to entry An inferior putty can also be made by the addition of water to hydrated lime powder.	
		3.3.6 air- hardening lime		Ed	Term is imprecise. BS EN 459 uses air lime, not air-hardening lime Poorly worded	air lime non-hydraulic lime which hardens by a reaction with carbon dioxide from the air in the presence of moisture to form a carbonate. It cannot harden under water or in the absence of carbon dioxide.	
		3.3.8 dolomitic lime		Ed	Poorly worded - more helpful to describe the lime in more detail rather than the dolomitic limestone from which is is derived. The definition derived from BS EN 459 is clearer	Air lime, derived from dolomitic limestone, consisting mainly of calcium magnesium oxide and / or calcium magnesium hydroxide.	

1 MB = Member body / NC = National Committee (enter the ISO 3166 two-letter country code, e.g. CN for China; comments from the ISO/CS editing unit are identified by **)

2 Type of comment: ge = general te = technical ed = editorial

Template for comments and secretariat observations

Date:	Document:	Project:
-------	-----------	----------

MB/ NC ¹	Line number (e.g. 17)	Clause/ Subclause (e.g. 3.1)	Paragraph/ Figure/ Table/ (e.g. Table 1)	Type of comment ²	Comments	Proposed change	Observations of the secretariat
		3.3.9 fat lime		Ed	Poorly worded Clarification	lime characterized by good workability, usually related to a high content of calcium oxide (CaO + MgO >95%), which approximately doubles its volume or more when slaked. It does not set under water and can be entirely dissolved by water before carbonation.	
		3.3.10 lean lime		Ed/Tech	Clarification	lean lime is usually defined as a lime with less calcium oxide than a fat lime (85 % < CaO + MgO < 95 %) and containing inert material. When slaked, its volume increases very little. Lean lime does not set under water but dissolves only partially before carbonation. When used in a mortar it has reduced workability and binds less sand per given volume than fat lime.	
		3.3.12 hydrated lime (powder)		Ed	Poorly worded Also slightly misleading – it perhaps implies that all hydrated lime is powdered, which is incorrect. Any slaked lime, whether powder or putty is hydrated. However, in the UK it has become normal to use the term hydrated lime to refer only to the dry bagged product, but strictly speaking this is incorrect. Suggest two separate definitions are required – one for hydrated lime, and one for powdered hydrated lime.	hydrated lime any lime mainly in the hydroxide form, produced by slaking (hydration) of quicklime powdered hydrated lime Dry powdered lime mainly in the hydroxide form, produced by slaking (hydration) of quicklime with the addition of a stoichiometric amount of water	

1 **MB** = Member body / **NC** = National Committee (enter the ISO 3166 two-letter country code, e.g. CN for China; comments from the ISO/CS editing unit are identified by **)

2 **Type of comment:** **ge** = general **te** = technical **ed** = editorial

Template for comments and secretariat observations

Date:	Document:	Project:
-------	-----------	----------

MB/ NC ¹	Line number (e.g. 17)	Clause/ Subclause (e.g. 3.1)	Paragraph/ Figure/ Table/ (e.g. Table 1)	Type of comment ²	Comments	Proposed change	Observations of the secretariat
		3.3.13 hydraulic lime		Te, Ed	<p>Contains some incorrect information – Vicat’s classification is NOT comparable to the classification in BS EN 459 – the modern classes are much stronger than Vicat’s classes</p> <p>Date of Vicat’s research is wrong – 1837 was first date of the English translation of his work</p> <p>Clarification</p>	<p>a lime with hydraulic properties setting primarily by reaction with water. Made either by firing naturally-occurring limestone that contains clay minerals (e.g. silica and alumina) at temperatures up to 1250° C to form hydraulic quicklime which may be slaked to form hydrated hydraulic lime (<i>Natural Hydraulic Lime</i> or NHL in EN 459-1), or by blending non-hydraulic lime powder with other materials such as cement, blast furnace slag, fly ash and other suitable materials (<i>Hydraulic Lime</i> or HL in EN-459-1)</p> <p>NOTE 1 to entry Natural hydraulic lime contains a mix of hydrated lime, silicates and aluminates which harden through reaction with water and by carbonation.</p> <p>Based on research published by Vicat in 1828, which defined three classes of hydraulicity of hydraulic lime, corresponding to setting time under water and other properties, a UK system of classification evolved which, by the early 20th century, comprised three classes known as:</p> <p>— <i>Feebly (slightly) hydraulic lime</i> A lime with low hydraulic properties produced from limestone containing less than 12 % clay</p> <p>— <i>Moderately hydraulic lime</i> A lime with moderate hydraulic properties produced from limestone containing between 12 % to 18 % clay.</p> <p>— <i>Eminently hydraulic lime</i> A lime with high hydraulic properties produced from limestone containing between 18 % to 25 % clay.</p> <p>These historic classifications do not correspond to the three classes of hydraulic lime defined in EN 459-1, which are based on compressive strengths at 28 days:</p>	

¹ MB = Member body / NC = National Committee (enter the ISO 3166 two-letter country code, e.g. CN for China; comments from the ISO/CS editing unit are identified by **)

² Type of comment: ge = general te = technical ed = editorial

Template for comments and secretariat observations

Date:	Document:	Project:
-------	-----------	----------

MB/ NC	Line number (e.g. 17)	Clause/ Subclause (e.g. 3.1)	Paragraph/ Figure/ Table/ (e.g. Table 1)	Type of comment ²	Comments	Proposed change	Observations of the secretariat
		3.3.14 hydraulic binder		Ed	Imprecise terminology – many hydraulic binders undergo two stage hardening – a rapid initial set due to hydration followed by a longer hardening process due to carbonation.	binder that sets and hardens partly or primarily by chemical reaction with water (for example Portland cement, hydraulic lime). Most hydraulic binders undergo a two stage hardening process – a rapid initial set due to hydration followed by a longer hardening process due to carbonation.	
		3.3.15 mixed binder		Ed	Imprecise terminology This term is not widely used and suggest omitting it. Terms more commonly used are pozzolanic lime, hydraulic lime or gypsum-gauged lime	binder that hardens both by chemical reaction with water and by reaction with carbon dioxide (for example lime-pozzolan, lime-gypsum)	
		3.3.16 natural cement		Ed	Further detail needed	hydraulic binder, produced by calcination of a naturally-occurring argillaceous limestone at a temperature below its sintering point, which is then ground to a fine powder	
		3.3.17 Portland cement		Te/Ed	Poorly worded Contains some incorrect information – gypsum retards the set	product of the calcination of a mixture of limestone and clay-containing materials at temperatures up to 1450° C. The resulting clinker is ground to a fine powder. Other materials may be added to modify the properties of the cement. Most Portland cements contain a small amount of added gypsum to lengthen the setting time. NOTE 1 to entry Portland cement is the dominant hydraulic binder in use today for building.	
		3.4.1 calcination		Ed	Clarification	process of heating a compound so that it is either oxidized, reduced or loses water, for instance heating of limestone	

1 MB = Member body / NC = National Committee (enter the ISO 3166 two-letter country code, e.g. CN for China; comments from the ISO/CS editing unit are identified by **)

2 Type of comment: ge = general te = technical ed = editorial

Template for comments and secretariat observations

Date:	Document:	Project:
-------	-----------	----------

MB/ NC	Line number (e.g. 17)	Clause/ Subclause (e.g. 3.1)	Paragraph/ Figure/ Table/ (e.g. Table 1)	Type of comment ²	Comments	Proposed change	Observations of the secretariat
		3.4.2 Slaking		Ed	Not capitalised in English Clarify The process is not necessarily controlled. Dolomitic lime also contains calcium Add information about exothermic reaction from 3.3.5	slaking Synonymous with hydration. Process whereby quicklime (calcium oxide, CaO or calcium magnesium oxide, CaMgO) is combined with water to form slaked lime (calcium hydroxide, Ca(OH) ₂ or calcium magnesium hydroxide, CaMg(OH) ₂) to form lime putty or dry powdered lime Note: Hydration is a strongly exothermic reaction .	
		3.4.3 Hydration		Ed/Te	Not capitalised in English Poorly worded Applies also to partially dehydrated compounds e.g calcium sulphate hemi- hydrate is hydrated to form calcium sulphate dihydrate The formation of hydrated calcium silicate and aluminates are covered by the main definition, so no need to mention them separately. The note 1 seems very unclear. Suggest this is checked by a competent cement chemist.	hydration reaction of an anhydrous or partially- dehydrated compound with water, yielding a new compound, in a hydrated form, that combines water in its crystal structure.	
		3.4.4 carbonatio n		Te	Carbonation also occurs in magnesian lime, and also in pure lime putty (i.e. not just mortars)	process by which lime (calcium hydroxide Ca(OH) ₂ or calcium magnesium hydroxide (CaMg(OH) ₂) reacts with carbon dioxide (CO ₂) from the ambient environment and reverts to calcium carbonate (CaCO ₃) or calcium magnesium carbonate (CaMg(CO ₃) ₂). As a result of this chemical change the lime becomes harder, more stable and less soluble than in its un-carbonated form	

1 **MB** = Member body / **NC** = National Committee (enter the ISO 3166 two-letter country code, e.g. CN for China; comments from the ISO/CS editing unit are identified by **)

2 **Type of comment:** **ge** = general **te** = technical **ed** = editorial

Template for comments and secretariat observations

Date:	Document:	Project:
-------	-----------	----------

MB/ NC	Line number (e.g. 17)	Clause/ Subclause (e.g. 3.1)	Paragraph/ Figure/ Table/ (e.g. Table 1)	Type of comment ²	Comments	Proposed change	Observations of the secretariat
		3.4.5 cementation index (C.I.) / hydraulic index		Te	Cementation index is not the same as the hydraulic index Clarification of equation Name spelt wrong - Boynton	cementation index (C.I.) formula for assessing the capacity of binder materials such as hydraulic lime to develop strength by reacting directly with water (Boynton 1966) defines the CI as: $CI = 2.8 \times \%SiO_2 + 1.1 \times \%Al_2O_3 + 0.7 \times \%Fe_2O_3$ $\%CaO + 1.4 \times \%MgO$ where SiO ₂ is the reactive silica. NOTE 1 to entry This definition applies to modern hydraulic binders.	
		3.4.6 Slurry		Ed	Not capitalised in English	slurry	
		3.5.1 Perpend		Ed	Not capitalised in English	perpend	
		3.5.2 Pointing		Ed Te	Not capitalised in English Clarification needed – the first and last parts of this definition are essentially the same so can delete part	pointing the (process of) filling the outer part of a (brick or stone) masonry joint with a mortar that may be similar or different in composition to the bedding mortar (see 3.2.2). The word is also used to describe the full depth of mortar which has been inserted after the original bedding mortar.	
		3.5.3 repointing		Ed	Clarification – “re-pointing” and “pointing mortar” are two different things and need separate definitions	The process of raking out fresh, plastic bedding mortar from the outer part of a masonry joint or removing the outer part of a hardened mortar joint and replacing with pointing mortar (see 3.2.2)	
		3.5.4 raked joint		Ed	Poorly worded	the space in a joint resulting from the removal of the outer mortar so that it is set back from the surface of the masonry, usually with the intention of repointing	

1 MB = Member body / NC = National Committee (enter the ISO 3166 two-letter country code, e.g. CN for China; comments from the ISO/CS editing unit are identified by **)

2 Type of comment: ge = general te = technical ed = editorial

Template for comments and secretariat observations

Date:	Document:	Project:
-------	-----------	----------

MB/ NC ¹	Line number (e.g. 17)	Clause/ Subclause (e.g. 3.1)	Paragraph/ Figure/ Table/ (e.g. Table 1)	Type of comment ²	Comments	Proposed change	Observations of the secretariat
		3.6.1		Te	This seems badly worded and confusing – check with a chemist		
		3.6.2 Clinker		Ed	Not capitalised in English	clinker	
		3.6.3		Te	Limestone is mainly calcium carbonate,. If it contains magnesium carbonate it is called dolomitic limestone or dolostone	sedimentary rock composed mainly of calcium carbonate	
		3.6.5 pozzolan		Ed	Clarification	a siliceous or siliceous and aluminous material which, on its own, possesses little or no hydraulic properties but will, in a finely divided form and in the presence of moisture, chemically react with calcium hydroxide at ordinary temperatures to form compounds possessing hydraulic properties. Pozzolans can be natural (e.g. volcanic material from Pozzuoli, Santorini, Rhine Valley) or artificial (e.g. fly ash, ceramic powder, fume silica, ...). The term derives from a natural source of such volcanic material at Pozzuoli in Italy.	
		3.6.7 sharp (sand)		Ed	Wrong. Rounded particles, even if coarse, are not termed sharp.	sand with mainly angular grains.	
		3.6.9 Silt		Ed	Not capitalised in English	silt	
		3.6.11 Gravel		Ed/te	Not capitalised in English Also glacial deposits	gravel natural aggregate resulting from alluvial or glacial processes. It is characterized by coarse, smooth, rounded or spherical grains	
		3.6.13 Cocciopesto		Ed	Not capitalised in English Incomplete	cocciopesto a mortar of lime and crushed fired clay products such as bricks or roof tiles, which may give a pozzolanic reaction. These are ground or crushed to different aggregate sizes (from dust to several cm in size). It is characterised by an orange-red colour and high porosity	

1 **MB** = Member body / **NC** = National Committee (enter the ISO 3166 two-letter country code, e.g. CN for China; comments from the ISO/CS editing unit are identified by **)

2 **Type of comment:** **ge** = general **te** = technical **ed** = editorial

Template for comments and secretariat observations

Date:	Document:	Project:
-------	-----------	----------

MB/ NC ¹	Line number (e.g. 17)	Clause/ Subclause (e.g. 3.1)	Paragraph/ Figure/ Table/ (e.g. Table 1)	Type of comment ²	Comments	Proposed change	Observations of the secretariat
		3.7.1 Hydraulicit y		Ed	Not capitalised in English	hydraulicity	

1 **MB** = Member body / **NC** = National Committee (enter the ISO 3166 two-letter country code, e.g. CN for China; comments from the ISO/CS editing unit are identified by **)

2 **Type of comment:** **ge** = general **te** = technical **ed** = editorial