**KENYA STANDARD**

**KS 2168-1:2020**

ICS [##.###]

**2nd Edition**

# Masonry cement- Specification

# Part 1:

# Composition, specification and conformity criteria

Kenya Bureau of Standards
Standards for Quality life

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# Masonry cement

## Part 1:

## Composition , specification and conformity criteria

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# Foreword

This Kenya Standard was prepared by the Cement and Lime Technical Committee under the guidance of the Standards Projects Committee, and it is in accordance with the procedures of the Kenya Bureau of Standards.

This second edition cancels and replaces the first edition which has been technically revised.

KS 2168 consists of the following parts, under the general title Introductory element — Main element:

- Part 1: Composition, Specifications and conformity criteria
- Part 2: Test method

During the preparation of this standard, reference was made to the following documents(s):

EN 413 Masonry cement Part 2: Test method

# Masonry cement

# Part 1:

# Composition, specification and conformity criteria

## 1. Scope

This Standard specifies the definition and composition of masonry cements as commonly used in for the production of mortar for bricklaying and blocklaying and for rendering and plastering. It includes physical, mechanical and chemical requirements and defines strength classes.

This standard also states the conformity criteria and the related rules. Necessary durability requirements are also given.

NOTE For normal applications the information given in this standard is generally sufficient. However, in special cases, an exchange of additional information between the masonry cement producer and user can be helpful. The details of such an exchange are not within the scope of this standard but should be dealt with in accordance with other regulations or can be agreed between the parties concerned.

## 2. Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EAS 148-1, Methods of testing cement — Part 1: Determination of strength
EAS 148-2, Methods of testing cement — Part 2: Chemical analysis of cement
EAS 148-3, Methods of testing cement — Part 3: Determination of setting time and soundness
EAS 148-6, Methods of testing cement — Part 6: Determination of fineness
EAS 148-7, Methods of testing cement — Part 7: Methods of taking and preparing samples of cement
EAS 18-1, Cement — Part 1: Composition, specifications and conformity criteria for common cements
KS 2168-2, Masonry cement — Part 2: Test methods
KS 1780-1, Building lime - Part 1: Definitions, specifications and conformity criteria
EN 12878, Pigments for the colouring of building materials based on cement and/or lime - Specifications and methods of test

## 3. Terms and definitions

For the purposes of this document, the following terms and definitions apply.

**3.1.**
**masonry cement**
factory made finely powdered hydraulic binder which relies essentially upon the presence of Portland cement clinker to develop strength. When mixed with sand and water only and without the addition of further materials it produces a workable mortar suitable for use in rendering, plastering and masonry work

**3.2.**
**additives**
constituents which are added to improve the manufacture or the properties of the masonry cement, e.g. grinding aids, air-entraining agents

**3.3.**
**autocontrol testing**
continual testing by the manufacturer, of masonry cement spot samples taken at the point(s) of release from the factory/depot

**3.4.**
**control period**
period of production and despatch identified for the evaluation of the autocontrol test results

**3.5.**
**characteristic value**
value of a required property outside of which lies a specified percentage, the percentile $P_k$, of all the values of the population

**3.6.**
**specified characteristic value**
characteristic value of a mechanical, physical or chemical property which in the case of an upper limit is not to be exceeded or, in the case of a lower limit is, as a minimum, to be reached

**3.7.**
**single result limit value**
value of a mechanical, physical or chemical property which, for any single test result as in the case of an upper limit is not to be exceeded or, in the case of a lower limit is, as a minimum, to be reached

**3.8.**
**allowable probability of acceptance $C_R$**
for a given sampling plan, the allowed probability of acceptance of masonry cement with a characteristic value outside the specified characteristic value

**3.9.**
**sampling plan**
specific plan which states the (statistical) sample size(s) to be used, the percentile $P_k$ and the allowable probability of acceptance $C_R$

**3.10.**
**spot sample**
sample taken at the same time and from one and the same place, relating to the intended tests. It can be obtained by combining one or more immediately consecutive increments (see EAS 148-7)

## 4. Notation

Masonry cement is designated by the term 'MC'.
There are two strength classes of masonry cement 12.5 and 22.5.

The term 'X' designates masonry cements in which an air entraining agent is not incorporated.

## 5. Requirements

### 5.1. General

The physical, mechanical and chemical properties of masonry cements shall be measured by the test methods described in KS 2168-2 and in the relevant parts of EAS 148. These Standards give alternative test methods for some properties but in the event of a dispute only the reference methods shall be used. Where allowed in the relevant part of EAS 148, different methods may be used provided they give correlated and equivalent values to those obtained using the reference method.

The Standard sand (see EAS 148-1) used to make the mortars for the tests required by 5.3.5 and 5.3.6 shall have a silica content (as quartz) of not less than 93 %.

All requirements are specified as characteristic values. They serve to define the performance level and classification of the masonry cements.

### 5.2. Constituents and composition

Masonry cement shall comprise Portland cement clinker, inorganic constituents and where appropriate additive(s) as given in Table 1. Calcium sulfate is added in small quantities to the other constituents of masonry cement during its manufacture to control setting.

The inorganic constituents of masonry cements conforming to KS 2168-1 shall be materials selected from:

- natural mineral materials;
- mineral materials used for or derived from the clinker production process;
- hydrated and/or hydraulic building limes conforming to KS 1780-1;

- constituents specified in EAS 18-1;
- inorganic pigments (except those containing carbon black) conforming to EN 12878.

NOTE Carbon black has a detrimental effect upon the air entrainment.

Additives shall not promote corrosion of embedded metal such as reinforcement and wall ties or impair the properties, including behaviour in fire, of the mortar made from the masonry cement. Organic pigments are not permitted.

**Table 1 — Composition of masonry cements**

| Type | Content % by mass | |
|---|---|---|
| | Portland cement clinker | Additives |
| MC 12.5, MC 12.5X<br><br>MC 22.5, MC 22.5X | ≥ 40 | ≤ 1[a] |
| [a] The quantity of organic additives on a dry basis shall not exceed 0.5 % by mass of the masonry cement. | | |

The manufacturing process and its control shall ensure that the composition of masonry cement is kept within the limits fixed in KS 2168-1. Masonry cements consist ultimately of individual small grains of different materials and are statistically homogeneous in composition resulting from quality assured production and material handling processes.

A high degree of uniformity in all masonry cement properties shall be obtained through mass production processes, in particular, adequate grinding and homogenization. Qualified and skilled personnel and the facilities to test, evaluate and adjust product quality are indispensable for producing masonry cement in accordance with this Standard.

## 5.3. Physical and mechanical requirements

### 5.3.1. Fineness (sieve residue)

The residue on a 90 µm sieve shall be not more than 15 % by mass when determined in accordance with EAS 148-6.

### 5.3.2. Initial setting time

The initial setting time shall be not less than 60 min when determined in accordance with KS 2168-2.

### 5.3.3. Final setting time

Where the initial setting time is less than 6 h, there is no requirement for final setting time. Where the initial setting time is 6 h or more, the final setting time shall be not more than 15 h when determined in accordance with KS 2168-2.

### 5.3.4. Soundness

The expansion shall be not more than 10 mm when determined in accordance with EAS 148-3.

### 5.3.5. Fresh mortar requirements

The properties of air content and water retention of fresh mortar shall be measured in accordance with KS 2168-2, on a mortar of standard consistence that shall have a value of penetration of (35 ± 3) mm using the plunger apparatus as the reference method. The flow table test is the alternative method. The test results shall meet the requirements given in Table 2.

**Table 2 — Fresh mortar requirements given as characteristic values**

| **Type** | **Air content<br>% by volume** | **Water retention<br>% by mass** |
|---|---|---|
| MC 12.5<br>MC 22.5 | ≤ 6 [a] | ≥ 75 |
| MC 12.5 X<br>MC 22.5 X | ≤ 6 [a] | ≥ 75 |
| [a] The control of the masonry cement manufacturing process ensures that this upper limit is not exceeded. | | |

### 5.3.6. Compressive strength

The compressive strength when determined in accordance with EAS 148-1, at the fixed water/masonry cement ratio of 0.50 shall have the values given in Table 3.

**Table 3 — Compressive strength requirements given as characteristic values**

| **Type** | **7 day (early) strength MPa** | **28 day (standard) strength MPa** | |
|---|---|---|---|
| | minimum | minimum | maximum |
| MC 12.5<br>MC 12.5 X | 7 | 12.5 | 32.5 |
| MC 22.5<br>MC 22.5 X | 10 | 22.5 | 42.5 |

Should it not be possible to remove the prisms from the moulds after 24 h, it is permitted to remove them at 48 h. Where the prisms are demoulded at 48 h this shall be recorded.

EAS 148-1 gives repeatability and reproducibility values for 28 day strength. On account of their lower strengths, values of 4 % and 8 % respectively are appropriate for masonry cements conforming to this Standard.

### 5.4. Chemical requirements

The properties of the masonry cement shall conform to the requirements given in Table 4 when determined by the method indicated in this table.

**Table 4 — Chemical requirements given as characteristic values**

| **Property** | **Reference test method** | **Type** | **Value<br>% by mass** |
|---|---|---|---|
| Sulfate content (as $SO_3$) | KS EAS 148-2 | MC 12.5<br>MC 12.5X<br>MC 22.5<br>MC 22.5X | ≤ 3.5 |
| Chloride content | KS EAS 148-2 | MC 12.5<br>MC 12.5 X<br>MC 22.5<br>MC 22.5X | ≤ 0.10 |

### 5.5. Durability requirements

To ensure durability, the requirements of 5.2 shall be met.

In many applications, particularly in severe environmental conditions, the choice of masonry cement type from this standard has an influence on the durability of mortar. The choice of masonry cement type for different applications and exposure classes shall follow the appropriate standards and/or regulations valid in the place of use of the mortar.

### 5.6 Packaging requirements

This cement shall be packaged by weight of 25 kg.

## 6. Standard designation

Masonry cement conforming to this Standard shall be identified using the notation in Clause 4, i.e. the symbol 'MC', followed by the strength class and when relevant, by the letter 'X'.

EXAMPLE Masonry cement KS 2168-1 MC 12.5 X.

## 7. Marking

The bag containing the masonry cement, or its accompanying delivery note, shall be identified with the following

a) The name, trade mark or other means of identification of the manufacturer to facilitate traceability to the works in which the masonry cement was manufactured;

b) the name, and strength class of the cement; e.g. masonry cement, type MC 12.5 X;

c) the number and date of this Kenya Standard, i.e. KS 2168-1;

d) the weight of the masonry cement 25 Kg;

e) A warning written in front of the bag. It shall be at 200 mm from the top of the bag. It shall be in red colour, at least 11 mm font size and bold text stating

“For laying masonry, mortar for rendering and plastering only.” Figure 1 gives the right positioning.

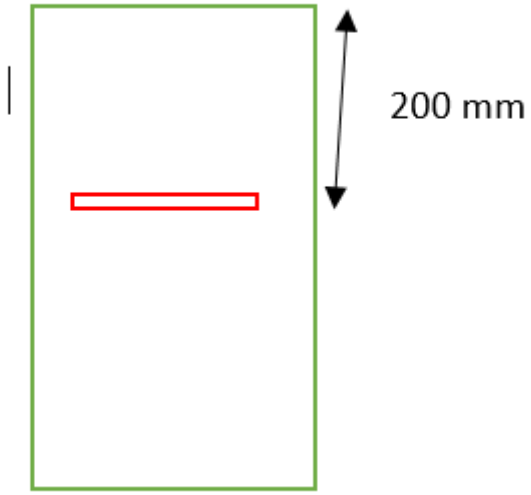


Figure 1- Positioning of “For laying masonry, mortar for rendering and plastering only” statement on the cement bags or packages for masonry cement.

## 8. Test report

If a test report is requested from the manufacturer, it should include results of the following tests on samples of masonry cement relating to the material delivered:

a) compressive strength at 7 days, if appropriate, and also at 28 days (see 5.3.6);

b) initial setting time (see 5.3.2);

c) soundness (see 5.3.4);

d) sulfate content (see 5.4);

e) chloride content (see 5.4);

f) air content (see 5.3.5);

g) water retention (see 5.3.5).

h) final setting time (see 5.3.3)

## 9. Conformity criteria

### 9.1. General requirements

Conformity of masonry cement to this Standard shall be continuously evaluated on the basis of testing spot samples. The properties, test methods and the minimum testing frequencies for the autocontrol testing by the

manufacturer are specified in Table 5. Concerning testing frequencies for masonry cement not being despatched continuously and other details, see EAS 18-2.

For certification of conformity by an approved certification body, conformity of masonry cement to this Kenya Standard shall be evaluated in accordance with KS EAS 18-2.

NOTE This Standard does not deal with acceptance inspection at delivery.

### 9.2. Conformity criteria for physical, mechanical and chemical properties and evaluation procedure

### 9.2.1. General

Conformity of masonry cement with physical, mechanical and chemical requirements in KS 2168-1 is assumed if the conformity criteria specified in 9.2.2 and 9.2.3 are met.

Conformity shall be evaluated on the basis of continual sampling using spot samples taken at the point of release and on the basis of the test results obtained on all autocontrol samples taken during the control period.

### 9.2.2. Statistical conformity criteria

#### 9.2.2.1. General

Conformity shall be formulated in terms of a statistical criterion based on:

- the required characteristic values for physical, mechanical and chemical properties as specified in 5.3 and 5.4;
- the percentile $P_k$ on which the specified characteristic value is based, as specified in Table 6;
- the allowable probability of acceptance CR as specified in Table 6.

**Table 5 — Properties, test methods and minimum testing frequencies for the autocontrol testing by the manufacturer, and the statistical assessment procedure**

| Property | Masonry cements to be tested | Test method [a, b] | Autocontrol testing | | | |
|---|---|---|---|---|---|---|
| | | | Minimum testing frequency | | Statistical assessment procedure | |
| | | | Routine situation | Initial period for a new type of masonry cement | Inspection by | |
| | | | | | Variables [d] | Attributes [f] |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Strength<br>- 7 days<br>- 28 days | all | KS EAS 148-1 [e] | 1 each 2 weeks | 2/week | | X |
| Initial setting time | all | KS 2168-2 | 1 each 2 weeks | 2/week | | X |
| Final setting time | as appropriate | KS 2168-2 | | | | X |
| Soundness (expansion) | all | KS EAS 148-1 | 1/month | 1/week | | X |
| Sieve residue | all | KS EAS 148-1 | 1/month | 1/week | | X |
| Water retention | all | KS 2168-2 | 1/month | 1/week | | X |
| Sulfate content | all | KS EAS 148-2 | 1 each 2 weeks | 2/week | | X |

| | | | | | | |
|---|---|---|---|---|---|---|
| Chloride content | all | KS EAS 148-2 | 1/month | 1/week | | X |
| Composition | all | -[c] | 1/month | 1/week | | X |

[a] Where allowed, other methods than those indicated may be used provided they give results correlated and equivalent to those obtained with the reference method (except initial type testing).

[b] The methods used to take and prepare samples shall be in accordance with the requirements of KS EAS 148-1.

[c] Appropriate method chosen by the manufacturer and for which a correlation with the method(s) used for initial type testing can be established.

[d] If the data is not normally distributed, then the method of assessment may be decided on a case by case basis.

[e] See 5.3.6.

[f] If the number of samples is at least 1 each week during the control period, the assessment may be made by variables.

**Table 6 — Required values of Pk and CR**

| | **Air content (upper limit) 28 day strength (lower limit)** | **All other requirements** |
|---|---|---|
| The percentile $P_K$ on which the characteristic value is based | 5 % | 10 % |
| Allowable probability of acceptance CR | 5 % | |

NOTE Conformity evaluation by a procedure based on a finite number of test results can only produce an approximate value for the proportion of results outside the specified characteristic value in a population. The larger the sample size (number of test results), the better the approximation. The selected probability of acceptance CR controls the degree of approximation by the sampling plan.

Conformity with the requirements of this Standard shall be verified either by variables or by attributes, as described in 9.2.2.2 and 9.2.2.3 as specified in Table 5.

The control period shall be 24 months.

**9.2.2.2. Inspection by variables**

For this inspection, the test results are assumed to be normally distributed.
Conformity is verified when Equations (1) and (2), as relevant, are satisfied.

For this inspection, the test results are assumed to be normally distributed.

Conformity is verified when equations (1) and (2), as relevant, are satisfied.

$$\bar{x} - k_A s \geq L \quad (1)$$

And

$$\bar{x} + k_A s \leq U \quad (2)$$

Where

$\bar{x}$ is the arithmetic mean of the totality of the autocontrol test results in the control period;

s is the standard deviation of the totality of the autocontrol test results in the control period;

$k_A$ is the acceptability constant;

L is the specified lower limit given in Tables 2 and 3;

U is the specified upper limit given in Tables 2, 3 and 4

The acceptability constant kA depends on the percentile PK on which the characteristic value is based, on the allowable probability of acceptance CR and on the number n of the test results. Values of kA are listed in Table 7.

**Table 7 — Acceptability constant**

| **Number of test results n** | $K_A$ [a] | |
|---|---|---|
| | **For $P_k$ = 5%** [b] | **$P_k$ = 10 %** [c] |
| 20 to 21 | 2.40 | 1.93 |
| 22 to 23 | 2.35 | 1.89 |
| 24 to 25 | 2.31 | 1.85 |
| 26 to 27 | 2.27 | 1.82 |
| 28 to 29 | 2.24 | 1.80 |
| 30 to 34 | 2.22 | 1.78 |
| 35 to 39 | 2.17 | 1.73 |
| 40 to 44 | 2.13 | 1.70 |
| 45 to 49 | 2.09 | 1.67 |
| 50 to 59 | 2.07 | 1.65 |
| 60 to 69 | 2.02 | 1.61 |
| 70 to 79 | 1.99 | 1.58 |
| 80 to 89 | 1.97 | 1.56 |
| 90 to 99 | 1.94 | 1.54 |
| 100 to 149 | 1.93 | 1.53 |
| 150 to 199 | 1.87 | 1.48 |
| 200 to 299 | 1.84 | 1.45 |
| 300 to 399 | 1.80 | 1.42 |
| >400 | 1.78 | 1.40 |
| NOTE Values given in this table are valid for CR = 5 %. | | |
| [a] The value of kA valid for each intermediate value on n may be used instead.<br><br>[b] For air content (upper limit) and 28 days strength (lower limit).<br><br>[c] For all other strength, physical and chemical requirements. | | |

#### 9.2.2.3 Inspection by attributes

The number $c_D$ of test results outside the characteristic value shall be counted and compared with an acceptable number $c_A$ calculated from the number n of autocontrol test results and the percentile $P_k$ as specified in Table 8.

Conformity is verified when the following equation (3) is satisfied:

$$c_D \leq c_A \quad (3)$$

The value of $c_A$ depends on the percentile $P_k$ on which the characteristic value is based, on the allowable probability of acceptance CR and on a number n of the test results. Values of $c_A$ are listed in Table 8.

**Table 8 — Values of cA**

| **Number of test results n** [a] **$P_k$ = 10 %** | $C_A$ | **Number of test results n a Pk = 5 %** |
|---|---|---|
| 20 to 39 | 0 | 20 to 79 |
| 40 to 54 | 1 | 80 to 109 |

| | | |
|---|---|---|
| 55 to 69 | 2 | 110 to 139 |
| 70 to 84 | 3 | 140 to 169 |
| 85 to 99 | 4 | 170 to 199 |
| 100 to 109 | 5 | 200 to 219 |
| 110 to 123 | 6 | 220 to 247 |
| 124 to 136 | 7 | 248 to 273 |
| NOTE Values given in this table are valid for CR = 5 %. | | |
| [a] If the number of test results is n < 20 a statistically based conformity criterion is not possible. Despite this, a criterion of $c_A = 0$ shall be used in case where n < 20. | | |

### 9.2.3. Single result conformity criteria

In addition to the statistical conformity criteria, conformity of test results with the requirements of this Standard requires that it shall be verified that each test result remains within the single result limit values specified in Table 9.

**Table 9 — Limit values for single results**

| **Property** | **Limit values for single results** | | | |
|---|---|---|---|---|
| | **MC 12.5** | **MC 22.5** | MC 12.5 X | MC 22.5 X |
| Strength (MPa)<br>lower limit value<br><br>7 day<br>28 day | <br><br><br>6<br>10.5 | <br><br><br>9<br>20.5 | <br><br><br>6<br>10.5 | <br><br><br>9<br>20.5 |
| Strength (MPa)<br>upper limit value<br><br>28 day | <br><br><br>37.5 | <br><br><br>47.5 | <br><br><br>37.5 | <br><br><br>47.5 |
| Initial setting time (min) lower limit value | 45 | | | |
| Final setting time (11) upper limit value | 17[a] | | | |
| Soundness (expansion in mm) upper limit | 10 | | | |
| Sulfate content (as % SO [a)]<br>upper limit value | 4.0 | 4.0 | 4.0 | 4.0 |
| Chloride content (%) upper limit value | 0.10 | 0.10 | 0.10 | 0.10 |
| Water retention (%) lower limit value | 70 | | | |
| Air content (%)<br><br>lower limit value<br>upper limit value | <br><br>6<br>25 | <br><br>6<br>25 | <br><br>-<br>- | <br><br>-<br>- |
| [a] where appropriate (see 5.3.3) | | | | |

### 9.3. Conformity criteria for masonry cement composition

At least once per month the composition of the masonry cement shall be checked by the manufacturer, using as a rule a spot sample taken at a point of release. The masonry cement composition shall meet the requirements specified in 5.2. The limiting quantities of the Portland cement clinker specified in Table 1 are reference values to be met by the average composition calculated from the spot samples taken in the control period. For single results, maximum deviations of -2 from the reference value are allowed. Suitable procedures during production and appropriate verification methods to ensure conformity to this requirement shall be applied and documented.

## Annex A
(informative)

## Guidance on use of the product

### A 1 Safety

### A 1.1 Manual handling of bags

The use of 25 kg bags of cement reduces the risk of injury.

### A.1.2 Safety in use

#### A.1.2.1 Regulations

In the manufacture, supply and use of the cement, it is recommended that:

a) the health risks of the cement in use be assessed and then prevented or controlled;

b) product health and safety information sheets be made available from the manufacturer/supplier;

c) bags containing masonry cement be labelled with a health and safety warning indicating that the cement is an irritant;

#### A.1.2.2 Hazards

When masonry cement becomes damp or is mixed with water, to make mortar, a concentrated alkaline solution is produced. Where this comes into contact with the eyes or skin, it may cause serious burns and ulceration. The eyes are particularly vulnerable and injury will increase with contact time.

Concentrated alkaline solutions, in contact with skin, tend to damage the nerve endings first before damaging the skin, therefore chemical burns can develop without pain being felt at the time.

In addition, cement mortar can, until it has set, cause both irritant and allergic contact dermatitis:

a) irritant contact dermatitis results from a combination of the moisture content, alkalinity and abrasiveness of cement mortar;

b) allergic contact dermatitis is mainly a consequence of the sensitivity of an individual's skin to water-soluble hexavalent chromium, in solution.

Attention is drawn to the fact that high repeated exposures, to airborne cement, in excess of certain limits have been linked with rhinitis and coughing.

#### A.1.2.3 First aid measures

a) In the event that eyes come into contact with masonry cement, wash eyes immediately with copious amounts of clean water for a period of at least 15 minutes and seek medical advice without delay.

b) In the event that skin comes into contact with masonry cement, wash the affected area thoroughly with soap and water before continuing the activity. If irritation, pain or skin trouble occurs, seek medical advice.

Clothing or footwear contaminated by wet cement, or cement-mortar should be removed and washed immediately and thoroughly before being reused.

#### A.1.2.4 Use of personal protective equipment (PPE)

1) Where the risk of cement becoming airborne can be neither prevented nor completely controlled, the use of appropriate respiratory protective equipment is recommended. In addition, dustproof goggles should be worn in order to protect the eyes.

2) Where the risks from contact with wet cement or wet mortar can be neither prevented nor completely controlled, appropriate protective equipment should be worn as follows.

a) Waterproof protective clothing should be worn in order that cement, or any cement and water mixture, e.g. mortar, does not come into contact with the skin. Should wet mortar enter waterproof footwear, waterproof gloves or other waterproof protective clothing, then the item(s) of clothing should be removed immediately and the skin thoroughly washed with soap and water. Items of waterproof protective clothing that have been worn should be washed before reuse.

b) Where this appropriate protective equipment takes the form of eye protection, wherever there is a risk of cement, or any wet cement mixture, entering the eye, dustproof goggles should be worn.

### A.2 Storage

To protect masonry cement from premature deterioration after delivery, bulk silos should be waterproof, clean and dry (internal condensation minimized).

Bags should be stored unopened, clear of the ground and in cool, dry conditions protected from excessive draught. Stacks of bags should be no more than eight-high and should be protected by a waterproof structure. Significant deterioration can begin after four to six weeks of storage in bags in normal conditions, and considerably sooner under adverse weather conditions or high humidity.

### A.3 Test temperature

Test methods for testing masonry mortar require that standardized properties are tested at specified target temperatures, subject to specified tolerances. If cement is tested under different temperature conditions, the results are likely to be affected. Appropriate advice on how different temperature conditions can affect results should be available from the manufacturer.

### A.4 Rendering and plastering

Where masonry cement is to be used in renders or plasters that are pumped through small apertures, such as spray nozzles, it is recommended that the user passes the cement or suspension through a screen of suitable mesh aperture to retain any occasional coarse particles.

### A.5 Use of masonry cement in mortar

The mix proportions (by volume) required to produce any given type of prescribed mortar will vary depending on the composition and bulk density of the masonry cement. Manufacturers' advice should be followed to achieve the required type.

## Annex B
## (informative)
## Sampling and testing for acceptance inspection at delivery

**B.1** For acceptance at delivery, when requested, a spot sample of the masonry cement should be taken in accordance with the relevant clauses of EAS 148-7 either before, or at the time of delivery. A laboratory sample should be prepared from the spot sample and packed in accordance with EAS 148-7. A sampling report should be completed at the time of sampling and should be attached to the laboratory sample in accordance with EAS 148-7.

NOTE 1 Testing may be delayed for up to three months from the time of sampling, provided that there is confirmation that the sample has been stored continuously in the manner described in EAS 148-7.

**B.2** When the masonry cement is tested for compressive strength (see 5.3.6), it is recommended that the source from which the Standard sand (see EAS 148-1) is obtained and the compaction procedure used should be the same as those in use by the manufacturer at the time the cement was originally tested.

NOTE It should be noted that the source of Standard sands and the compaction procedure can, within permitted limits (see EAS 148-1:2005, 11.2.3.3 and 11.3.2.3), influence the strength achieved.

**B.3** When the masonry cement is tested for chemical properties (see 5.4), the sample should be prepared by the method described in EAS 148-2.

**B.4** The testing of properties of the laboratory sample should be carried out in accordance with the relevant methods in KS 2168-2 or the EAS 148 series of standards.

**B.5** The limiting values applicable to acceptance inspection of masonry cement should be those given in Table NB.1.

Table B.1 Acceptance Inspection limiting values

| Property | | Type | |
|---|---|---|---|
| | | MC 12.5 X | MC 22.5 X |
| Compressive strength (MPa) | 7 day - | 6 | 9 |
| lower limit value | 28day | 10.5 | 20.5 |
| Compressive strength (MPa) upper limit value | 28 days | 37.5 | 47.5 |
| Setting times | | | |
| initial - lower limit (min) | | 45 | 45 |
| Final - upper limit (h) | | 17 | 17 |
| Soundness | | | |
| maximum (mm) | | 10 | 10 |
| Sulfate content (as % $SO_3$) maximum (% by mass) | | 3.5[1] | 3.5[1] |
| Chloride content maximum (% by mass) | | 0.1 | 0.1 |
| Water retention lower limit (% by mass) | | 70 | 70 |
| Air content | | | |
| upper Limit (% by volume) | | - | - |
| lower limit (% by volume) | | - | - |
| [1] 4.0 % by mass if the Portland cement clinker can be shown to be not less than 55 | | | |