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## CERTIFICATION SCHEME FOR CEMENT

### 1 Scope

This document specifies the scheme for the evaluation of conformity of cements to their corresponding product specification standards, including certification of conformity by a certification body.

The document also provides technical rules for factory production control by the manufacturer, including, sampling, testing of samples and products, tasks of the certification body and other stakeholders. It also provides rules/procedures for actions to be followed in the case of non-conformity, the procedure for the certification of conformity and requirements for dispatching centers.

In ES 1188-2 the word "cement" is used to refer both to common cements as defined in CES 28 and to other cements and binders for which the relevant product specification standard makes reference to ES 1177-2 and which is submitted for certification. Such cement is produced at a given factory and belongs to a particular type and a particular strength class, as defined and specified in the relevant product specification standard.

### 2 Normative references

The following Ethiopian Standard contains provisions, which, through reference to this text, constitute provisions of this Ethiopian Standards. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this Ethiopian Standards are encouraged to investigate the possibility of applying the most recent editions of the Ethiopian Standards indicated below.

ES 1176 - 1 Methods of testing cement - Part 1: Determination of strength.

ES 1176-7, Methods of testing cement - Part 7: Methods of taking and preparing samples of cement.

ES 1177-1, Cement - Part 1: Composition, specifications and conformity criteria for common cements.

ES ISO 17025, General requirements for the competence of testing and calibration laboratories.

ES ISO/IEC 17065 - Conformity assessment – Requirements for bodies certifying products, processes and services.

ES ISO 2854, Statistical interpretation of data - Techniques of estimation and tests relating to means and variances.

### 3 Definitions

For the purposes of this scheme, the following definitions shall apply :


#### 3.1 Specific definition

##### 3.1.1 Certified cement

Cement for which a certificate of conformity has been issued by relevant legal body.

### 4. Specific Requirements



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#### 4.1 Management systems

##### 4.1.1 Quality policy statement

The quality manual shall include a statement developed by management defining its quality policy, objectives and commitments to the attainment of product quality, handling of non-conforming product, record and document control system.

##### 4.1.2 Management representative

The manufacturer shall appoint a management representative who, irrespective of other responsibilities, shall have defined authority and responsibility for ensuring that the requirements of this certification scheme, for the evaluation of conformity are implemented and maintained.

##### 4.1.3 Internal audits and management review

In order to ensure the continuing suitability and effectiveness of the quality manual and the requirements of this certification scheme, the manufacturer shall perform internal audit and management review at least once a year:

- a) Internal audit shall take in to consideration the scope of clause 4 of this certification scheme.
- b) A management review of the factory production control shall take into account records of the internal audits.

##### 4.1.4 Training

The quality manual shall describe the measures to be taken to ensure that all the personnel involved in operations that can affect internal quality control and product quality have appropriate relevant educational level and field, experience, and trainings. Moreover, relevant records show the competency of the experts shall be retained


#### 4.2 System of documentation

##### 4.2.1 Document control

The management representative shall be responsible for the control of all documents and data related to factory production control and to this document for the evaluation of conformity. In addition She/he shall ensure all appropriate documents are available at essential locations. All outdated documents shall be withdrawn and that changes or modifications to any document shall be made effectively and timely prepared in order to prevent misuse of the of documents.

##### 4.2.2 Quality records

The manufacturer shall retain records of factory production control for at least the period required to comply with relevant legislation.

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### 4.3 Process control

#### 4.3.1 General

The Quality Manual documentation shall describe:

- a) Parameters for production process;
- b) Validated procedures for testing other than test methods specified in CES 99 (if any);
- c) Verification methods;
- d) Inspection procedures;
- e) Corrective action procedures;
- f) The methods used by the manufacturer to ensure that the bottled drinking water produced conforms CES 99
- g) Needs procedure to ensure that non-conforming product is adequately managed,
- h) Dispatch with the associate records.

#### 4.3.2 Constituents and composition of cement

The manufacturer shall establish and document procedures and appropriate test methods to ensure that the constituents meet the requirements of the relevant product specification standard and are suitable to enable cement to be produced meeting the technical specification.

The quality manual shall describe the methods used by the manufacturer to ensure that the composition of the cement produced conforms to the relevant product specification standard, including appropriate test methods.

### 4.4 Control of non conforming products

The quality manual shall contain procedures to ensure that off-specification production is adequately managed.

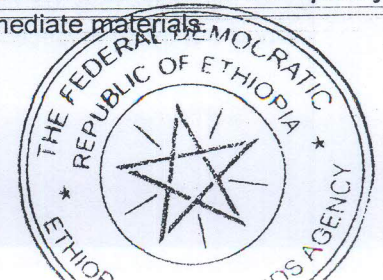
### 4.5 Sampling, Measuring and testing


#### 4.5.1 Inspection, measuring and test equipment

The equipment used for measuring and testing shall be regularly checked and calibrated in accordance with the procedures and frequencies laid down in the operation manual. These procedures may include comparison of test results with other laboratories (external quality assurance)

#### 4.5.2 Inspection and test status

Procedures for the inspection and test status at the level of manufacture shall be detailed in the quality manual. These shall include procedures for the control of non conforming intermediate materials.



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#### 4.5.3 Handling, storage, packaging and delivery

The quality manual shall describe the precautions to be taken for the protection of the quality of the cement while under the responsibility of the manufacturer. It shall include a description of the procedures used at depots. Delivery documentation shall allow traceability to the products. Production and packaging date shall be included.

#### 4.5.4 Sampling and testing

The manufacturer shall operate a system of auto-control testing for each certified cement. This system shall be used to demonstrate conformity to the requirements in the clause entitled "Conformity criteria" in the relevant product specification standard. The properties to be tested, the testing methods, the minimum frequency of auto-control testing during routine testing and initial period testing and the conformity criteria shall be in accordance to the basic requirements given in the clause entitled "Conformity criteria" in the relevant product specification standard. For cements not being dispatched continuously, the frequency of testing and the point of sampling shall be as specified in the Working quality manual. All test results shall be documented.

#### 4.5 Corrective action

The quality manual shall include procedures for the review and adjustment of the factory production control in case of non-conformity (see 9.1 of CES 28). The actions which are taken in the case of non-conformity shall be recorded in a report subject to inspection during the management review. In the case of test results which show not conforming to the single result limit value conformity criteria specified in CES 28 product specification, the manufacturer shall immediately determine the affected quantity, take appropriate action to prevent the dispatch of this quantity and inform the affected customer if such cement has been released. In addition, the manufacturer shall immediately determine the cause of such non-conformity, take corrective actions and undertake a review of all relevant factory production control procedures. All such actions and findings shall be appropriately recorded in a report subject to inspection during the management review

**NOTE:** The certification body may require to be kept informed of these actions and findings.

#### 4.6 Measuring and test equipment for auto-control testing

The equipment used for auto-control testing shall be regularly checked and calibrated in accordance with procedures and frequencies laid down in the Works' quality manual. These procedures may include comparison of compressive strength test results by proficiency testing with another laboratory designated in the Works' quality manual. The quality manual shall document procedures to ensure that all personnel involved in auto-control testing have appropriate experience and training.


##### 4.6.1 Quality records

The manufacturer shall retain records of the auto-control test results and appropriate records on test equipment for at least the period required to comply with relevant legislation.

#### 4.7 Surveillance, assessment and acceptance of the factory production control

##### 4.7.1 General Tasks of certification body

The certification body has responsibility for three separate functions - certification, inspection and testing. These three functions may be carried out by one body or by more than one body. The inspection function may be carried out by an inspection body and the testing function by a testing body. Reference to the certification body

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includes reference to any sub-bodies it has. The certification body shall comply with those clauses of ISO/IEC Guide 17065, and ISO 17025 which are relevant to this scheme for the evaluation of conformity.

#### 4.7.2 Inspection tasks

The inspection tasks include surveillance, assessment and acceptance of the factory production control operated by the manufacturer. Inspection shall include checking any major change in the Working' quality manual which is relevant to the factory production control of cement has been reported to the certification body by the manufacturer within one month of its implementation. Inspection shall verify that the factory production control complies with the requirements of clause 5 of CES 28 and has been carried out according to the quality manual.

#### 4.7.3 Frequency of inspections

The inspections shall normally be carried out once a year and the certification body shall inform the manufacturer in advance when an inspection is to be conducted.

#### 4.7.4 Reports

Following each inspection, a confidential report shall be prepared and sent to the manufacturer and the certification body shall consult, if appropriate; the manufacturer before corrective action is taken.

The certification body and the manufacturer shall have consultation before decision is made by either of them. The certification body shall then make a decision on its final assessment.

### 4.8 Evaluation of the results of auto-control testing of samples

#### 4.8.1 Evaluation tasks

Surveillance, assessment and acceptance of the factory production control includes evaluation of the test results of the manufacturer's auto-control testing to check conformity to the statistical conformity criteria and single result limit values in the relevant product specification standard.

#### 4.8.2 Number and time of evaluations

The number of evaluations of the results of auto-control testing of samples shall be at least two times per year. The time of the evaluations shall be decided in advance.

#### 4.8.3 Control period


The length of the control period for evaluation of the auto-control test results shall be as specified in the clause entitled "Conformity criteria" in the relevant product specification standard, or equal to the initial period (see 8.5.1) in the case of a newly certified cement.

#### 4.8.4 Evaluation of test results

Each evaluation shall be made on the test results obtained on all auto-control samples of given certified cement, without selection, taken during the control period preceding the date of the evaluation or during the initial period as the case may be.

**NOTE:** The evaluation of the test results shall exclude any test result accepted as an outlier by the certification body. In the case of managed step changes in product properties or in the case of limited production or dispatching runs during the control period the corresponding data sets may be evaluated separately.



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The evaluations may normally be carried out by correspondence and each evaluation shall lead, for the property examined, to a single conclusion in respect of the set of test results as a whole.

#### **4.8.5 Reports**

Following each evaluation a confidential report shall be prepared and a copy sent to the manufacturer.

### **4.9 Audit testing of samples taken at the factory/depot and initial type testing**

#### **4.9.1 Sampling**

Spot samples shall be taken under the responsibility of the certification body at the point(s) of release of cement from the factory and/or depots supplied with cement by the factory. These are taken principally in order to provide a check on the accuracy of the manufacturer's test results. Representatives of the certification body shall be granted access to the factory/depots at any time without giving prior notice in order to allow the samples to be taken.

#### **4.9.2 Number of samples**

The number of samples taken shall be at least six per year for each certified cement dispatched continuously from the factory. When certain certified cements are not dispatched continuously, this frequency and the point of sampling may be altered by mutual agreement between the certification body and the manufacturer.

The first sample of a cement to be certified is used for initial type testing. The number of samples to be taken during the initial period shall be at least one per month.

#### **4.9.3 Properties and test methods**

The mechanical, physical and chemical properties specified for testing in the clause entitled "Conformity criteria" in the relevant product specification standard shall be determined according to the indicated test methods.

#### **4.9.4 Testing**

Each taken sample shall be homogenized and divided into three sub-samples. The methods used to take and prepare samples shall be in accordance with ES 1176-7. One sub-sample shall be retained by the manufacturer for testing and one shall be packed, sealed, clearly labelled and forwarded to the testing laboratory. The third sub-sample shall be sealed and retained by the manufacturer for a minimum period of three months. It is intended for use if:

- a) One of the first two sub-samples is lost, deteriorates or becomes contaminated;
- b) Further testing is needed in the case of dispute.
- c) The first two sub-samples shall be tested, one by the manufacturer and one by the testing laboratory, for the required properties as listed in the relevant product specification standard, using the test methods indicated in that standard.

#### **4.9.5 Evaluation of test results**

The results obtained shall be evaluated by the certification body. The procedures described in annex A shall be used for the evaluation of the representativeness and accuracy of the 28 day strength results.

#### **4.9.6 Reports**

~~Following each evaluation of audit test results a confidential report shall be prepared without delay and a copy~~

