



उत्पाद मैनुअल
पोर्टलैंड निस्तापित मृत्तिका चुना पत्थर सीमेंट के लिए मृत्तक
आई एस 18189:2023 के अनुसार

PRODUCT MANUAL
PORTLAND CALCINED CLAY LIMESTONE CEMENT
ACCORDING TO IS 18189:2023

विभिन्न उत्पादों के लिए भारतीय मानक ब्यूरो) अनुरूपता मूल्यांकन (विनियम, 2018 की योजना -I के तहत प्रमाणन के संचालन में एकरूपता और पारदर्शिता के लिए इस उत्पाद मैनुअल का उपयोग सभी क्षेत्रीय / शाखा कार्यालयों और लाइसेंसधारियों द्वारा संदर्भ सामग्री के रूप में किया जाएगा। दस्तावेज़ का उपयोग बीआईएस प्रमाणन प्राप्त करने के इच्छुक संभावित आवेदकों द्वारा भी किया जा सकता है।

This Product Manual shall be used as reference material by all Regional/Branch Offices & licensees to ensure uniformity of practice and transparency in operation of certification under Scheme-I of Bureau of Indian Standards (Conformity Assessment) Regulations, 2018 for various products. The document may also be used by prospective applicants desirous of obtaining BIS certification.

1.	मानक संख्या IS No.	:	IS 18189 : 2023
	शीर्षक Title	:	Portland Calcined Clay Limestone Cement
	संशोधनों की संख्या No. of amendments	:	0
2.	नमूना दिशानिर्देश Sampling Guidelines		
a)	कच्चा माल Raw material	:	Please refer to Annex-A Note: This section indicates the requirements for raw material (if specified in the IS) for which compliance is to be established during Grant of Licence/Change in Scope of Licence/ Factory Surveillance
b)	समूहीकरण दिशानिर्देश Grouping Guidelines	:	Nil

c)	नमूने का परिमाण Sample Quantity	:	Cement – 8 kg for physical test, 1 kg for chemical test Conformity of Raw material per the relevant Indian Standard shall be ensured at the time of GoL/CSoL Note: This section indicates the quantity of the sample of the product and/or the raw material (if applicable), required to be sent to the laboratory for testing, for the purpose of Grant of Licence/Change in Scope of Licence/ Factory Surveillance (incase of market surveillance, effort may be made to procure therequired quantity of product sample, as far as possible since raw material sample may not be available in market)
3.	परीक्षण उपकरणों की सूची List of Test Equipment	:	Please refer to Annex-B
4.	निरीक्षण और परीक्षण की स्कीम Scheme of Inspection and Testing	:	Please refer to Annex-C
5.	एक दिन में संभावित परीक्षण Possible tests in a day		
	(i) Insoluble Residue (ii) Loss of ignition (iii) Fineness (iv) Setting time Note: This section is for the guidance of BIS Certification Officers/Technical Auditors of BIS Authorized Outside Surveillance Agencies (OSAs) during factory inspection to provide readyreference regarding the tests which can be witnessed during the inspection in the factory by the officer/auditor.		
6.	लाइसेंस का दायरा /Scope of the Licence:		
	Licence is granted to use Standard Mark on Portland Calcined Clay Limestone Cement as per IS 18189:2023		
	Name of the product	Portland Calcined Clay Limestone Cement	
	Any other aspect required as per the Standard	Transverse strength test is optional test as per agreement between purchaser and manufacturer	

भारतीय मानक ब्यूरो
 BUREAU OF INDIAN STANDARDS
 मानक भवन, ९, बहादुर शाह ज़फ़र मार्ग
 Manak Bhawan, 9, Bahadur Shah Zafar Marg
 नई दिल्ली- ११०००२
 New Delhi – 110002

ANNEX A

Details of Raw Materials

Raw Material	Mode of Establishing Compliance
Calcined Clay Pozzolana (Cl 4.1)	supplier test certificate/test report from BIS recognized lab/empanelledlab or any other lab having accreditation as per IS/ISO/IEC 17025 or in house testing/combination thereof, as per Clause 4.1 of IS 18189:2023
Limestone (Cl 4.2)	supplier test certificate/test report from BIS recognized lab/empanelledlab or any other lab having accreditation as per IS/ISO/IEC 17025 or in house testing/combination thereof, as per Clause 4.2 of IS 18189:2023
Portland Cement Clinker (Cl 4.3)	supplier test certificate/test report from BIS recognized lab/empanelled lab as per Clause 4.3 of IS 18189:2023
Portland Cement (Cl 4.4)	Shall be ISI marked OPC 43 grade cement and received with supplier test certificate alongwith its traceability as per IS 269.

ANNEX B

List of Test Equipment

SI No.	Tests used in with Clause Reference	Test equipment
1.	Fineness Clause 7 Table 3	Blaine's apparatus variable flow type
		Stop watch with start-stop mechanism
		Mercury for calibration (reagent grade or better)
		Balance, Standard weights
		Standard Cement
		Manometer liquid (di-butyl phthalate or light mineral oil.)
		Pyknometer.
		Circular discs of filter paper of medium porosity (mean pore diameter 7 μ).
		Le-Chatelier's flask
		Constant temperature water bath to maintain temp. within $\pm 0.1^{\circ}\text{C}$
2.	Soundness by Autoclave Clause 7 Table 3	Auto clamp machine with thermostatic control to maintain pressure of 2.1 MPa for 3 hrs, pressure to be attained within 1-1 $\frac{1}{4}$ hrs;
		L-Shape thermometer LC 1°C
		Pressure gauge 0-42 kg/cm ² LC = 0.4 kg/cm ²
		Humidity chamber with temperature & RH control $27 \pm 2^{\circ}\text{C}$, RH 90 to 100 %
		Standard bar 308 mm, max
		Bar moulds 25 x 25 x 282 mm
		Length comparator with dial gauge
3.	Soundness by Le-chatelier Method Clause 7 Table 3	Mineral oil for covering moulds
		Le-Chatelier's water bath preferably with thermostatic control raising temperature from $27 \pm 2^{\circ}\text{C}$ to boiling in 27 ± 3 minutes
		Le-Chatelier's moulds with weights and cover glasses minimum 8 nos.
		Humidity chamber with temperature & RH control $27 \pm 2^{\circ}\text{C}$, RH 90 to 100 %
4.	Setting time Clause 7 Table 3	Steel scale 12" (304.8 mm)
		Vicat apparatus
		Needle for Consistency, IST& FST testing
		Moulds
		Stop Watch
		Balance – 1000 g ± 0.1 g and Standard Weights 1 mg to 500 gm
5.		Gauging trowel of weight 210 ± 10 g
		Vibration machine with timer & cube mould fitting assembly 12000 ± 400 vibration per min.

	Compressive Strength, Clause 7 Table 3	Compressive Strength machine
		Poking Rod , Petroleum Jelly
		Proving ring with all accessories suitable for calibration of CST machine
		Tachometer
		Cube Moulds 70.6 × 70.6 mm,
		Gauging trowel (210 ± 10 g) gauging plate, stainless steel(non-perforated)
		Standard sand grade 1, 2 and 3 (as per IS 650)
		Curing tank of appropriate size with water circulation arrangement
		Graduated glass cylinders 150 to 200 ml
		Humidity chamber with temperature & RH Control 27 ± 2° C, RH 90 to 100 %
6.	Transverse Strength, Clause 7, Table 3	Moulds
		Planetary Mixer, Standard Sand
		Jolting Apparatus, Scraper, Demolding device as per IS 4031 (Part 8)
7.	Drying shrinkage Clause 7, Table 3	Balance with weights Trowel Length comparator Flow table and Accessories Beam mould- 25 x 25 x 282 mm Humidity and Temperature control cabinet.
8.	IS 18189 : 2023	General equipments for Cement testing
a)	To control humidity & temperature in lab	1. Humidity chamber with temperature & RH control 27 ± 2 °C, RH 90 to 100 % 2. Suitable arrangement to demonstrate maintenance of temp. of 27 ± 2 ° C & RH 65 ± 5% constantly
b)	For cement Sampling	Mixing trays –adequate size including trays of 24 partitions for keeping hourly samples
c)	To control the residue of cement	Sieves of size (300, 212, 150, 90, 75 & 45µ)
d)	To measure temperature	Thermometers
e)	Lab ball mill (motorized)	To grind the clinker, slag & gypsum sample in lab ball mill for testing
f)	To weigh the material	1. Platform type balance 2. Electrical balance 3. Weight box with weights (1 mg - 500 g)
9.	General test equipment's for chemical testing Clause 6, Table 1 of IS 18189 : 2023	
		Muffle Furnace with thermostatic control, Range 0 – 1200° C
		Oven with thermostatic control 0-300° C
		Heater and hot plate
		Distillation Assembly
		Crucible: Platinum or Porcelain / silica
		Filter paper (no 1,40,41,42)

	Desiccators with cover & Desiccant	
	Water bath	
	pH meter/paper	
	Glassware - volumetric flask -0-250 ml, beaker 0-250 ml, measuring cylinder 0-50,100,500, 1000 ml, burette 0-25/50 ml, conical flasks- 0-250 ml, Pipette 0-5,10, 25, 50 ml	
	All chemicals required for complete chemical analysis of cement	
	Tongs including platinum tipped tong	
	Wire gauge with asbestos sheet at the middle	
	Washing bottle	
	Mortar mixer- 4.75 l Glass thermometer	
	All required chemicals as per IS 4032 for Portland Calcined Clay Limestone cement, Ordinary Portland cement and Portland clinker testing.	
10.	Calcined Clay Testing [clause 4.1 of IS 18189]	
	Chemical Test	Chemicals and glassware as per IS 1727 and IS 4032, Flame photometer
	Loss on ignition	Muffle furnace Crucible (Silica /Platinum) Weighing balance
	Fineness	Blain Apparatus Permeability cell, Disk, Plunger, Filler paper U- Tube manometer with manometer liquid Stop watch with Stop-Start mechanism Standard sample Mercury for calibration Pycnometer, Thermometer
	Residual on 45µ sieve	45µ sieve Balance Oven
	Lime reactivity	50 mm cubes moulds Planetary mixer, paddle, mixing bowl, scrapper Flow table and Accessories. Tamping rod Trowel etc.

ANNEX C

SCHEME OF INSPECTION AND TESTING

1. TEST RECORDS- The manufacturers shall maintain test records for the tests carried out to establish conformity, in various formats, Form 1 to Form 20.

1.1 The manufacturer shall prepare and implement a calibration plan for the in-house test equipment. The following equipment's shall be calibrated at a frequency shown against each and records kept.

SI No	TEST EQUIPMENT	FREQUENCY OF CALIBRATION
1.	Blaine's apparatus	Daily with licensee's own Standard cement sample and monthly with standard cement samples supplied by NCCBM.
2.	Compressive strength Testing machine	Once in a month with Licensee's own Proving Ring and the Proving Ring shall be Calibrated once in two years from a NPL/NABL Accredited Calibrating body or NPL or NPL accredited Proving Ring manufacturer.
3.	Autoclave pressure gauge	Once in a month by licensee's own dead weight pressure gauge tester OR once in six months from accredited calibrating body or NPL/NABL accredited manufacturer of such gauges.
4.	Vibration machine	Once in a month by licensee's own Tachometer. The tachometer shall be calibrated once in a year from NPL/NABL accredited outside agency.
5.	Dead weight pressure gauge Tester (if available)	Once in four years from NABL accredited Tester (if available) Lab or OEM (original Equipment manufacturer) having NPL/NABL accredited calibrator.

2. LEVELS OF CONTROL/CONTROL UNIT:

The definition of control unit is as follows:

2.1 For manufacturing units of Portland Calcined clay Limestone Cement: The tests, as indicated in Table 1 attached and at the levels of control specified therein, shall be carried out on the whole production of the factory which is covered by this scheme and appropriate records maintained in accordance with clause 1 above.

2.2 For packing of Portland Calcined clay Limestone Cement at bulk cement terminal: The tests, as indicated in Table 2 attached and at the levels of control specified therein, shall be carried out on the whole packing of Portland Pozzolana Cement and appropriate records maintained in accordance with clause 1 above.

2.2.2 For bulk packing units as per clause 1.4.2, all cement of one consignment received shall constitute one batch.

2.2.3 Batch mixing may be permitted for packing units, which are extended packing terminals of the same cement manufacturer (licensee) subject to packing units obtaining test certificates from the manufacturer and keeping proper records. If the cement is received from different units of the same manufacturer (different licensees) batch mixing of cement is not permitted. The Batch integrity shall be ensured at all stages of packing and the packer shall maintain appropriate controls and checks to ensure that there is no chance of mix up of different batches. Adequate care shall be taken to avoid spoilage during handling, packing and storage.

2.2.4 If bulk packing unit is instructed by BIS for suspension of licence due to the failure of the samples, such instruction will automatically apply to the original manufacturer of the cement, as per relevant suspension of licence guidelines. An undertaking to this effect shall be obtained from the bulk packers and the original cement manufacturer.

2.2.5 Test Certificate of each original batch of cement shall be obtained from the supplier and test results recorded. On the basis of tests and inspection, the decision regarding conformity or otherwise of the consignment/batch to a given requirement shall be taken.

2.3 **WEIGHMENT** – One filled bag from each nozzle shall be taken at random twice in each shift of operation and weight checked in case of electronic packers with recorders. In all other cases one filled bag from each nozzle shall be checked once in two hours. The records shall be maintained in Form 1. The bag shall be so chosen for weighment such that bags from each nozzle are taken for weighment. The weighing and packing machines shall be adjusted as and when necessary in such a way that net quantity of each bag shall be in accordance with the tolerances given in Annex B and clause 10.1.1 of IS 18189 : 2023. Such adjustments for each nozzle shall be recorded in Form 1 under remarks column.

2.3.1 For packing of Portland Calcined Clay Limestone Cement in bulk cement terminal weighment of hourly check of mass of drums also shall be done in addition to weighment of bags mentioned in para 1.5 above. The records of weighments shall be maintained in Forms 12 and 14.

2.4 RAW MATERIALS

Routine analysis of various raw materials used in the manufacture of Portland Calcined Clay Limestone Cement shall be made at intervals of a month or whenever there is a change in the source/mine area stratification whichever is earlier and appropriate records of the analysis and of the Physical composition of the mixtures shall be maintained in Form 2. This analysis is not applicable for Packing Units of Portland Calcined Clay Limestone Cement at bulk cement terminal.

2.5 **HOMOGENEITY** - Homogeneity of the mixture in a consignment shall be ensured within the stipulated percent of Calcined Clay addition. Percentage of Calcined Clay and Limestone addition shall be declared every time and marked on the bags/package.

2.6 However, all manufacturers shall ensure compliance of their products to all the requirements of the Indian Standard.

2.7 **PACKING** - The Cement shall be packed in bags as specified in clause 10 of IS 18189: 2023. A test certificate either from the manufacturer or from any recognized testing laboratory shall be received along with each consignment of bags. Alternatively, the samples of bags from

each consignment shall be tested by the cement manufacturer either in his own laboratory or any other BIS recognized laboratory before they are used for packing cement. No testing would be necessary if the bags carry BIS Certification Mark. The bag shall be in good condition at the time of packing.

3 ENSURING COMPLIANCE THROUGH TESTING- The manufacturers (licensees/applicants) shall establish a suitably equipped and staffed in house laboratory (In house testing facility) for testing at least those parameters of the Indian Standard which require routine testing for ensuring quality of the product in accordance with the method given in the specification. This includes in-process controls as may be defined and put in place by the manufacturer and testing parameters/requirements which can only be performed in the factory.

3.1 Table 1 given below indicates the levels of control. Column 2 of Table 1 indicates routine tests where test equipment is required in house as “R” or other tests which can be subcontracted as “S”. Subcontracting is permitted to BIS recognized/empanelled laboratory. For the tests being subcontracted to BIS recognized/empanelled laboratory, test reports issued by the laboratories shall be available for inspection by BIS.

4. LABELLING AND MARKING – Labeling and marking shall be as given below:

4.1 STANDARD MARK - The Standard Mark as given in the Schedule of the licence, shall be printed or stenciled on each bag or drum of Portland Pozzolana Cement – Fly ash based or on the label applied to it, provided the material in each bag or package to which the mark thus applied conforms to each requirement of the specification. The size of the Standard Mark shall be either **160 x 120 mm** or **80 x 60 mm** for packing in quantity of 50 kg and above. For other packing of lower quantity, a photographic reduction is permitted.

4.2 MARKING - As per the requirements of IS 18189:2023.

4.2.1 In addition to above, following marking shall also be marked:

- a) “For BIS certification details please visit www.bis.gov.in”
- b) Name of original manufacturer of cement with BIS licence number in case of repacking unit.
- c) Any other marking required under provisions of Legal Metrology Act, 2009 and Legal Metrology (Packaged Commodities) Rules, 2011 framed thereunder.

4.2.2 All the information including BIS Standard Mark except Manufacturers Registered Trademark shall be applied on each bag in **VIOLET COLOUR**.

4.2.3 Marking of variable parameters on cement bags which are changing with production schedule and done online (such as Date of manufacturing/Week number/Batch number, MRP, Percentage of addition of Calcined Clay and Limestone) is permitted in **BLACK COLOUR**. However, all such marking shall be conspicuous.

Note :

1. For each calendar year, the first week shall be counted as 7 days from 1st of January and subsequent weeks numbered serially accordingly. The bags shall be marked as W 01/MM/YY..... W 51/MM/YY..... etc.

2. Label mentioned at 3.1 and 3.2 above shall be attached to the seal of the container. The seal shall be of such a design that it shall automatically get destroyed on opening.
3. The colour of the bag and background colours should be in contrast to the colour of the Standard Mark and the details so that the markings are conspicuous.

5 PRODUCTION DATA - The licensee shall send to BIS a statement of quantity produced, marked and exported by him and the value thereof at the end of each quarter of the operative period as per the enclosed proforma and shall also submit these details to BIS at the end of the operative year duly authenticated by a Chartered Accountant.

6 REJECTION - All the production which conforms to the Indian Standard and covered under the scope of this licence shall be marked with the Standard Mark. Disposal of non-conforming product shall be done in such a way so as to ensure that there is no violation of provisions of BIS Act,2016.

TABLE 1***(ONLY FOR GUIDANCE PURPOSE)***

(1)				(2)	(3)			
TEST DETAILS				Test equipment requirement R: required (or) S: Sub- contracting permitted	RECOMMENDED LEVELS OF CONTROL			
Clause	Requirement	Test Methods Clause Reference			Number of sample	Frequency		Remark
						Cement Grinding/Blending	Cement Packing	
4.1	Calcined Clay	4.1	Clay – IS 18189 Annex B IS 1727	R	One	One sample shall be tested from each supplier once in a week as per IS 18189 (Annex B). No further testing required if accompanied with test certificate or ISI marked.		
4.2	Limestone	4.2	IS 18189 IS 1760 IS 4032	R	One	One sample shall be tested from each supplier once in a week as per IS 1760. No further testing required if accompanied with test certificate or ISI marked.		
4.3	Portland Cement Clinker	4.3	IS 18189 IS 4031 IS 4032	R	One	Daily composite sample shall be tested for complete requirement as per IS 16353. No further testing required if accompanied with test certificate or ISI marked.		
4.4	Ordinary Portland Cement	4.4	IS 18189 IS 269	-	-	OPC shall be ISI marked and shall be accompanied with manufacturer certificate. If OPC is produced in the same factory, records as per relevant SIT shall be maintained.		
6 Table 2	Chemical Requirement							
i)	Insoluble residue	6	IS 18189 IS 4032	R	One	Daily Composite sample	Weekly composite sample	-
ii)	Magnesia	6	IS 18189 IS 4032	R	One	Daily Composite sample	Weekly composite sample	-
iii)	Total Sulphur content calculated as sulphuric anhydride (SO3)	6	IS 18189 IS 4032	R	One	Daily Composite sample	Weekly composite sample	-
iv)	Loss on ignition	6	IS 18189 IS 4032	R	One	Daily Composite sample	Weekly composite sample	-
v)	Chloride Content	6	IS 18189 IS 4032	R	One	-	Weekly composite sample	This test shall also be carried out whenever there is any change in

								source of any raw material.
vi)	Alkali Content	6	-	S	One	-	-	Pl see note under Table 1 of IS 18189: 2023.

7, Table 3 Physical Requirement								
i)	Fineness	7	IS 18189 IS 4031 (Part 2)	R	One	1. Every alternate hourly from each mill separately. 2. Daily Composite sample	Daily Composite sample	-
ii)	Soundness (Le-Chatelier method and Autoclave method)	7	IS 18189 IS 4031(Part 3)	R	One	Daily Composite sample	Daily Composite sample	-
iii)	Setting Time	7	IS 18189 IS 4031 (Part 5)	R	One	One sample per shift (Composite sample)	Daily Composite sample	-
iv)	Compressive strength	7	IS 18189 IS 4031 (Part 6)	R	One	Daily Composite sample	Daily Composite sample	-
v)	Transverse strength (Optional)	7	IS 18189 IS 4031(Part 8)	S	One	Weekly composite sample	Weekly composite sample	-
vi)	Drying shrinkage	7	IS 18189 IS 4031(Part 10)	R	One	-	Weekly composite sample	

NOTES –

- Composite sample shall be made out of hourly samples for the required period (Pl see IS 3535 Methods of sampling hydraulic cements).
If cement is manufactured using same proportion of raw materials from more than one cement mill, sample from each mill shall be tested for fineness as per the above table.
For all other parameters composite samples from all the mills shall be tested.
If cement is manufactured using different proportion of raw materials from more than one cement mill, sample from each mill shall be tested for all requirements as per the above table.
- For manufacturing units where there is no packing silo and cement is packed directly from cement grinding, the frequency of tests specified for cement grinding stage would apply for the various tests to be carried out on samples taken from cement mill spouts along with weekly chloride content test.

Table 2

(1)				(2)	(3)		
TEST DETAILS				Test equipment requirement R: required (or) S: Sub-contracting permitted	RECOMMENDED LEVELS OF CONTROL		
Clause	Requirement	Test Methods			Number of samples	Frequency	Remarks
		Clause	Reference				
6 , Table 1 (i)	Insoluble Residue	6	IS 18189 IS 4032	R	One	Each batch	To be tested in laboratory at bulk terminal packing unit.
6, Table 1 (v)	Loss on Ignition	6	IS 18189 IS 4032	R	One	Each batch	
7, Table 2 (i)	Fineness	7	IS 18189 IS 4031(Part 2)	S	One	Each batch	-
7, Table 2 (ii)	Soundness	7	IS 18189 IS 4031(Part 3)	S	One	Each batch	
7, Table 2 (iii)	Setting Time	7	IS 18189 IS 4031(Part 5)	S	One	Each batch	
7, Table 2 (iv)	Compressive strength	7	IS 18189 IS 4031(Part 6)	S	One	Each batch	

FORMAT FOR MAINTENANCE OF TEST RECORDS WEIGHMENT CONTROL AT PACKING STAGE

[illegible]

RAW MATERIAL TESTING

Date of receipt of material	Date of testing	Name of Material	Source of supply and consignment No.	Details of analysis for specified requirements

(POST GRINDING DETAILS OF PRODUCTION ACCEPTED AND REJECTED FOR STANDARD MARK)

Shift	Quantity	Passed for Standard mark	Rejected	Remark

Pozzolana (One sample per week) Kaolinitic clay

[illegible]

Form No. 5

CLINKER CHEMICAL COMPOSITION (DAILY COMPOSITE SAMPLE)

Date of manufacture	Total loss on ignition	Insoluble residue	Alkali content as Na ₂ O @	C ₃ S	C ₃ A	C ₃ S+C ₂ S	SO ₃	MgO	Chloride	Free lime	LSF	Alumina factor	Sample Pass/Fail	Remarks

@ Alkali content test may be conducted as and when required by purchaser

Form No. 6

CLINKER GROUND WITH GYPSUM (DAILY COMPOSITE SAMPLE)

Date of grinding	Fineness	Soundness		Setting time		Compressive strength			Sample Pass/Fail	Remark
		Le-Chatelier	Autoclave	Initial	Final	3 days	7 days	28 days		

Form 7

CLINKER GROUND WITH GYPSUM & POZZOLANA

Date of grinding	Fineness	Soundness		Setting Time		Compressive strength			Drying Shrinkage	Sample Pass/ Fail	Mode of disposal or action taken if sample fails
		Le-Chatelier	Autoclave	Initial	Final	3 days	7 days	28 days			

Form 8

PORTLAND CALCINED CLAY Limestone CEMENT (GRINDING/ BLENDING) (Daily/Weekly Composite sample)

Date of grinding	IR	MgO	Total Sulphur calculated as SO ₃	LOI	Chloride Content	Alkali content @	Fineness	Soundness (Le-chatelier & Autoclave)	Setting Time Initial & Final	Compressive strength	Transverse Strength	Drying Shrinkage	Residue on 45 µm	Sample Pass/Fail	Action taken if sample fails

@ Alkali content test may be conducted as and when required by purchaser

Form No 9

PORTLAND CALCINED CLAY LIMESTONE CEMENT (For Alternate Hourly Sample)

Date of grinding	Time	Fineness	Setting Time Initial & Final	Sample Pass/Fail	Mode of disposal or action taken if sample fails

Form No 10

PORTLAND CALCINED CLAY LIMESTONE CEMENT PACKING STAGE (Daily/Weekly Composite Sample)

Date of Packing	Calcined Clay	Limestone	IR	MgO	Total Sulphur calculated as SO ₃	LOI	Chloride Content	Alkali content @	Fin e ness	Soundness (Le- chatelier & Autoclave)	Setting Time Initial & Final	Compressive strength	Transverse Strength	Drying Shrinkage	Residue on 45 µm	Sample Pass/ Fail	Mode of disposal or action taken if sample fails

@ Alkali content test may be conducted as and when required by purchaser

Form No 11

CALIBRATION

Sl. No	Date of calibration	Result of Calibration (Test records indicating details of standard values and observed values for each equipment to be kept in proforma for which various columns be devised; as required)	Name of equipment Action taken if equipment found defective	Sl.No. (If any) & Remarks

Note : The above records are to be kept separately for each equipment.

RECORDS TO BE MAINTAINED AS PER TABLE-2 OF SIT (BY BULK PACKING UNIT)

Form No. 12

**FORMAT FOR MAINTENANCE OF TEST RECORDS WEIGHMENT CONTROL AT PACKING STAGE
HOURLY CHECK OF MASS OF DRUMS**

Date	Time (Hourly)	Condition of Drums	Net quantity of cement	Record of calibration of weighing scale and Date of calibration.

Form No. 13

**FORMAT FOR MAINTENANCE OF RECORDS FOR THE CONDITIONS OF THE EMPTY
DRUMS/BULKERS FOR PACKING CEMENT**

Date	No. of empty drums/Bulkers checked	No. of empty drums/Bulkers rejected	Reasons/Remarks	Sign of firms inspector

Form No. 14

**FORMAT FOR MAINTENANCE OF TEST RECORDS WEIGHMENT CONTROL AT PACKING STAGE
HOURLY CHECK OF MASS OF BAGS**

Date	Shift	Time(Hourly)	No of Bags	Net quantity of Bags from Nozzles	Records of calibration/date of calibration of nozzles

Form No. 15 RECEIPT
OF CEMENTS

Date of receipt	Batch No.	Supply received from	Test Certificate No

Form No. 16

CEMENT DISPATCH DATA FROM PACKING

Date	Quantity	Passed for Standard Mark	Rejected (if any)	Reasons for not marking/Method of disposal

Form No 17 & 18

TEST DONE AT FACTORY (At receipt stage and at bulk packing terminal)

Date	Batch No.	LOI	IR	Fineness	Setting Time	Remarks

Form No 19 & 20

PORTLAND CALCINED CLAY LIMESTONE CEMENT (PHYSICAL TEST REPORT) (At receipt stage and at bulk packing terminal)

Date	Batch No.	Test Report	Soundness		Compressive Strength			Remarks
			LC	AC	3 days	7 days	28 days	