	NEPAL BUREAU OF STANDARDS AND METROLOGY NEPAL PRODUCT CERTIFICATION SCHEME	STI
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**SCHEME OF TESTING AND INSPECTION
 FOR CERTIFICATION OF
 PORTLAND POZZOLANA CEMENT according to
 NS 385
 Fly Ash Based/Calcined Clay Based**

1. LABORATORY – A laboratory shall be maintained which shall be suitably equipped and staffed where different tests given in the specification shall be carried out in accordance with the methods given in the specification.

2. TEST RECORDS - All records of tests, inspection and calibration shall be kept in suitable forms approved by the Bureau.

2.1 All testing apparatus/measuring instruments shall be periodically checked and calibrated and records of such checks/calibration shall be maintained.

2.2 Copies of any records and other connected papers that may be required by the Bureau shall be made available at any time on request.

3. QUALITY CONTROL – It is recommended that, as far as possible, Statistical Quality Control (SQC) methods may be used for controlling the quality of the product during production.

4.0 **CALIBRTION** – Periodic calibration of various testing equipments shall be carried out and records of such calibrations kept. The following equipments shall be calibrated at a frequency shown against each and records kept.

TEST EQUIPMENT

FREQUENCY OF CALIBRATION

- | | |
|--|---|
| i) Blaine's apparatus | Daily with licensee's own Standard cement sample and once in a month with standard cement samples |
| ii) 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 the recognized calibrating agency having certification of calibration. |

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6 **LEVELS OF CONTROL** - 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 and charts maintained in accordance with paragraph 2.0 above. All the production which conforms to the Nepal Standards and covered by the licence shall be marked with certification mark of the Bureau.

6.1 Each of the sample of cement taken for test shall satisfy the requirements of the specification.

6.2 **WEIGHMENT**- One filled bag from each nozzle shall be taken at random twice in a shift of operation and weighed in case of electronic packer with recorder. In all other cases one bag from each nozzle shall be checked once in two hours. The records maintained in Form 1. The weighing and packing machines shall be adjusted as and when necessary as indicated by the mass of these bags in such a way that net mass of each bag shall be 50 kg or 25 kg subject to the tolerances. Such adjustments for each nozzle shall be recorded in Form 1 under Remarks column.

7.0 **RAW MATERIALS** - Routine analysis of various raw materials going into the manufacture of Portland Pozzolana cement shall be made at intervals of a month or whenever there is a change in the source/mine area stratification which ever is earlier and appropriate records of the analysis and of the Physical composition of the mixtures shall be maintained (see Form 2)

8.0 In respect of all other clauses of the specification the factory will maintain appropriate control and checks to ensure that their product conforms to the various requirements of this specification.

9.0 **REJECTIONS** – A separate record shall be maintained giving information relating to the rejection of the production not conforming to the requirements of the specification and the method of its disposal. Such material shall in no circumstances be stored together with that conforming to the specification.

10.0 **PACKING** – In case cement is packed in appropriate bags .

10.2 **MANUFACTURER CERTIFICATE** : The manufacturer shall furnish with in ten days of dispatch of cement a certificate indicating the percentage of Pozzolana / Fly ash. The manufacturer shall also state in the certificate that the amount of Pozzolana / Fly ash in the finished cement shall be in the range from 10 to 25%.

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11.0 **SAMPLES** – The licensee shall supply, free of charge, the samples from the factory or godowns. The Bureau shall pay for the samples taken by it from the open market.

12.0 **REPLACEMENT** – Whenever a complaint is received soon after the goods with Standard Marks have been purchased and used, and if there is adequate evidence that the goods have not been misused, defective goods or their components are replaced or repaired free of cost by the licensee in case the complaint is proved to be genuine and the warranty period (where applicable) has not expired. The final authority to judge the conformity of the product to the Nepal Standard shall be with the Bureau.

13.0 In the event of any damages caused by the goods bearing the Standard Mark, or claim being filed by the consumers against BIS Standard Mark and not “conforming to” the relevant Nepal Standard, entire liability arising out of such non conforming product shall be of licensee and NS shall not in any way be responsible in such cases.

14.0 **STOP MARKING** – The marking of the product shall be stopped under intimation to the Bureau if, at any time, there is some difficulty in maintaining the conformity of their product to the specification, or the testing equipment goes out of order. The marking may be resumed as soon as the defects are removed under intimation to Bureau.

15.0 The marking of the product shall be stopped immediately if directed to do so by Bureau for any reason. The marking may then be resumed only after permission by the Bureau. The information regarding resumption of markings shall also be sent to the Bureau.

16.0 **PRODUCTION DATA** – The licensee shall send to NS as per the enclosed a statement of quantity produced, marked and exported by him and the trade value thereof at the end of each operative year of the licence.

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Table 1 NS 385
Portland Pozzolana Cement
(Fly ash based/ Calcined clay Based)
Table 1-A Levels of Control (Raw Material)
(Para 6 of the Scheme of Testing & Inspection)

TEST DETAILS				LEVELS OF CONTROL	
Cl.	Requirement	Test Methods		Frequency	Remarks
		Clause	Reference		
1	2	3	4	5	6
4.1	Pozzolana	4.1.1 to 4.1.4		One sample per week	
4.2	Portland cement clinker (Lab Ball Mill Testing)			Daily composite sample	i) For chemical requirements (Form 5) ii) Laboratory Ball-Mill Testing is required to be done when there is change in the source of Raw Material or change in design.



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4.3	Portland cement	-do-	-	Laboratory ball mill testing is not necessary if such test has been carried out on clinker intended to be used in manufacturer of OPC provided clinker identity is maintained (Form 6 A).
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NS 385
Portland Pozzolana Cement
(Fly ash based/ Calcined clay Based)
Table 1-A, Levels of Control
(Para 6 of the Scheme of Testing & Inspection)

TEST DETAILS			LEVELS OF CONTROL		
Cl.	Requirement	Test Methods Clause Reference	Cement Grinding (Form7&8)	Packed Cement (FORM 9)	Remarks
6	Chemical Composition i) Loss on ignition ii) Magnesia(Mgo) iii) Insoluble Material iv)Sulfuric Anhydried	NS532 -do- -do- -do-	Daily Composite Sample -do- -do- -do-	-	Chemical requirement of 6.1, (I) to (iv) shall comply with those given in table 1 of IS 1489 (Part 1)&(Part 2): 1991
9.2	Chloride content	IS 12423	-	Weekly composite sample	This test shall also be carried out whenever there is any change in source of any raw material.
7.	Physical requirements Fineness	NS 123	a)Every alternate hour from each mill separately b) Daily composite sample	Daily composite Sample	
7.2	Soundness	Le-chatelier Method of NS 123	Daily composite sample	-do-	
7.2	Soundness	Autoclave method of NS 123	-do-	-do-	
7.3	Setting time	NS 123	One Sample Per Shift(composite sample)	Daily composite sample	
7.4	Compressive Strength	NS 123	Daily composite sample	Daily composite Sample	
7.5	Drying Shrinkage	NS 123	Daily composite sample	Weekly composite sample	

NOTE - Composite sample shall be made out of hourly samples for the required period PI IS 3535 - Methods of sampling hydraulic cements)

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Form No. 1

**FORMAT FOR MAINTENANCE OF TEST RECORDS
WEIGHTMENT CONTROL AT PACKING STAGE (Clause 6.2 of STI)**

Date	Shift	Time (Hourly)	No of Bags	Net mass of bags from nozzles No.1, No. 2,	

Form No.2

RAW MATERIAL TESTING (CL.7 of STI)

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

Form No.3

**PRODUCTION DATA
(POST GRINDING DETAILS OF PRODUCTION ACCEPTED & REJECTED
FOR ISI MARK)
(CLAUSE 9 OF STI)**

Shift	Quantity	Passed for ISI Marking	Rejected	Remarks

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Form No. 4A

**POZZOLANA (One sample per week)
Column 6 of Table 1A
(A) Calcined clay pozzolana**

Date	Fitness	Lime Reactivity	Compressive Strength at 28 Days	Drying Shrinkage Max
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**FORM NO. 4 B
FLY ASH POZZOLANA (See Column 6 of Table 1 A)**


SO ₂ + Al ₂ O ₃ +Fe ₂ O ₃	Si O ₂	Mgo	Sulp hur SO ₃	N a	L O I	Fine ness q	Lime Reac tivity	Compr essive	Dryi ng Shrin kage	Soun dness
								Strengt h		Auto clave

**FORM NO.5
CLINKER (DAILY COMPOSITE SAMPLE) (See Column 6 of Table 1A)**

**Laboratory Ball-Mill Testing is required to be done when there is change in the source of Raw
Material or change in design**

Date of manu- acture	Total loss of Ignition	Insoluble Residue	SiO ₂	CaO	A l O	F e O	S O	Mg O	LSF Lime Saturati on Factor	Alunina Factor	Sample Pass/Fails	Disposal/ Action taken if sample fails

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FORM NO.6A

**CLINKER GROUND WITH GYPSUM (Daily composite sample)
(Note under Column 6 of Table 1 A)**

Date of Grinding	Fineness	Soundness (Le-chatelier/ Autoclave method)	Setting Time		Compressive Strength			Sample/Pass /fail	Disposal/Action taken if sample fails
			Initial (IST)	Final (FST)	3 days	7 days	28 days		

FORM NO. 6 B

**CLINKER GROUND WITH GYPSUM & POZZOLANA
(Column 6 of Table I A)**

Date of Grinding	Fineness	Soundness Lechatelier or Autoclave	Setting Initial (IST)	Time Final (FST)	Compressive Strength			Drying Shrinkage (Weekly)	Sample Pass/Fail	Mode of disposal or action taken if sample fails
					3 days	7 days	28 days			

FORM NO. 7

**PORTLAND POZZOLANA CEMENT GRINDING/ BLENDING (Daily/Weekly Composite sample)
(Column 5 of Table 1B)**

Date of Grinding	Loss on Ignition	MgO	Insoluble Material	S O ₃	Fineness	Soundness Le-ch Auto Clave	Setting Time		Compressive Strength			Drying Shrinkage (Weekly)	Sample Pass/Fail	Action taken if sample fails
							IST	FST	3 days	7 days	28 days			

FORM NO. 8

PORTLAND POZZOLANA CEMENT CRINDING (For Alternate hourly Samples) (Column 5 of Table 1B)

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Date of Grinding	Time at	Fineness	Setting Time Initial Setting Time(IST) Final Setting Time (FST)		Sample fail/pass	Mode of disposal/Action taken if sample fails

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FORM NO. 9
PORTLAND POZZOLANA CEMENT PACKING STAGE (Daily/Weekly Composite Samples)
(Column 6 of Table 1B)

Date of Pcking	Loss on Ignition	Mg O	Insoluble Material	S O 3	Chloride Content (Weekly)	Fine ness	Soundness Le Auto Ch Clave	Setting time IST FST	Compressive Strength 3 7 28 days daysdays	Drying Shrinkage (Weekly)	Sampl e Pass/F ail	Mode of disposal/Acti on taken if sample fails

FORM NO. 10
(See Clause 3 of STI)

S.No.	Date 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	Sl. No. (If any) Remarks
			Action taken if equipment found defective	

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