	<p style="text-align: center;">NEPAL BUREAU OF STANDARDS AND METROLOGY NEPAL PRODUCT CERTIFICATION SCHEME</p>	<p style="text-align: center;">STI</p>
<p>DOC:STI/49/</p>	<p style="text-align: center;">ISSUE 01</p>	<p style="text-align: right;">15 SEPT 2014</p>

**SCHEME OF TESTING AND INSPECTION FOR CERTIFICATION OF ORDINARY  
PORTLAND CEMENT ACCORDING TO NS 49**


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 as envisaged in this Scheme.
4. **CALIBRATION** – Periodic calibration of various testing equipment shall be carried out and records of such calibrations kept. The following equipment 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. |

Prepared by	Approved by	Page of Page 1 of 13
-------------	-------------	----------------------

	NEPAL BUREAU OF STANDARDS AND METROLOGY NEPAL PRODUCT CERTIFICATION SCHEME	STI
DOC:STI/49/	ISSUE 01	15 SEPT 2014

- iii) Autoclave pressure gauge

Once in a six months either by licensee's own dead weight Pressure gauge or from approved independent agency or proving ring manufacturer of such gauge having certification of calibration.
- iv) Vibration machine


Once in a month by licensee's own tachometer. The tachometer shall be Calibrated once in three Years from independent agency maintaining traceability to international standard
- v) .Dead wt pressure gauge Tester (if available)

Once in four years from accredited Lab or original Equipment manufacturer) having certification of calibration.

5. STANDARD MARK – The NS Mark shall be printed or stenciled on each bag or package of Portland cement or on the label applied to it, provided always that the material in each bag or package to which the mark is thus applied conforms to every requirement of the specification.

MARKING - In addition the following information should be given on each bag or package or on the label applied to it. The information and NS Mark with number and years shall be applied on each bag.:

- a) Name of the manufacturer and/or registered trade mark, if any.
- b) Type of Portland cement that is Ordinary Portland cement.
- c) Net Mass.
- d) Identification in code or otherwise to enable a week's lot of manufacture to be traced back to factory records. For this purpose each bag shall be marked the week and year of packing.

	<b>NEPAL BUREAU OF STANDARDS AND METROLOGY</b> <b>NEPAL PRODUCT CERTIFICATION SCHEME</b>	<b>STI</b>
<b>DOC:STI/49/</b>	<b>ISSUE 01</b>	<b>15 SEPT 2014</b>

**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 licensee 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 shall be 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 subject to the tolerances as given in the standard. Such adjustments for each nozzle shall be recorded in Form 1 under Remarks column.

**7. RAW MATERIALS** - Routine analysis of various raw materials going into the manufacture of Ordinary Portland 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.(See form 2).

**8.** In respect of all other clauses of the specification, the factory shall maintain appropriate controls and checks to ensure that their product conforms to the various requirements of the specification.

**9. 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.(See Form 3)

**10. PACKING** – cement shall be packed in appropriate bags .

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

**12. 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

Prepared by	Approved by	Page of Page 3 of 13
-------------	-------------	----------------------

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. In the event of any damages caused by the goods bearing the Standard Mark, or claim being filed by the consumers against NS Standard Mark and not “conforming to” the relevant Nepal standard, entire liability arising out of such non-conforming product shall be of licensee and NBSM shall not in any way be responsible in such cases.
14. 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. 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.



**Ordinary Portland cement**  
**Table 1 LEVELS OF CONTROL**  
**(Para 6 of the Scheme of Testing and Inspection)**

Test Details				Levels of Control			
Cl.	Requirement	Cl.	Reference	Clinker	Cement grinding	Packed Cement	Remarks
2.1	Chemical composition	-	NS 532	Daily composite sample	Weekly composite sample	Weekly composite sample	
	Sulphuric anhydride	-	NS 532	-	Daily composite sample	-	-
	Magnesia	-	-do-	-	-do-	-	-
	Insoluble residue	-	-do-	-	-do-	-	-
	Loss on ignition	-	-do-	-	-do-	-	-
	Fineness	-	NS 123	Laboratory Ball Mill Testing is required to be done when there is change in the Source of	1) Every alternate hour from each mill separately. 2) Daily composite sample	Daily composite sample	
	Soundness	-	Le- chatelier method NS 123	-do-	Daily composite sample	-do-	
	Soundness	-	Autoclave Method NS 123	- do -	-do-	-do-	
	Setting time	-	NS 123	-do-	One Sample Per Shift(Composite	-do-	

	NEPAL BUREAU OF STANDARDS AND METROLOGY NEPAL PRODUCT CERTIFICATION SCHEME		STI
	DOC:STI/49/	ISSUE 01	15 SEPT 2014

**NS 49**  
**Ordinary Portland cement**

**Table 1 LEVELS OF CONTROL**  
**(Para 6 of the Scheme of Testing and Inspection)**

Test Details				Levels of Control			
Cl.	Requirement	Cl.	Reference	Clinker	Cement grinding	Packed Cement	Remarks
	Compressive strength		NS 123	Laboratory Ball Mill Testing is required to be done when there is change in the Source of Raw Material or change in	a) Daily composite sample	Daily composite sample	

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

Prepared by	Approved by	Page of Page 6 of 13
-------------	-------------	----------------------

	NEPAL BUREAU OF STANDARDS AND METROLOGY NEPAL PRODUCT CERTIFICATION SCHEME		STI
	DOC:STI/49/	ISSUE 01	15 SEPT 2014

**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.,No.12	

**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 requirement

**Form No.3**

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

Shift	Quantity	Passed for NS Marking	Rejected	Remarks

Prepared by	Approved by	Page of Page 7 of 13
-------------	-------------	----------------------


	NEPAL BUREAU OF STANDARDS AND METROLOGY NEPAL PRODUCT CERTIFICATION SCHEME		STI
	DOC:STI/49/	ISSUE 01	15 SEPT 2014

**Form No. 4**  
**(Chemical Composition)**  
**CLINKER (DAILY COMPOSITE SAMPLE)**  
**(PI See COLUMN 5 OF TABLE 1)**

Date of manuf on	Total loss	Insolu ble Residu	SiO <sub>2</sub>	CaO	Al <sub>2</sub> O <sub>3</sub> /Fe <sub>2</sub> O <sub>3</sub>	Fe <sub>2</sub> O <sub>3</sub>	SO <sub>3</sub>	MgO	LSF	Sample Pass/Fail	Remarks

Prepared by	Approved by	Page of Page 8 of 13
-------------	-------------	----------------------



	NEPAL BUREAU OF STANDARDS AND METROLOGY NEPAL PRODUCT CERTIFICATION SCHEME		STI
	DOC:STI/49/	ISSUE 01	15 SEPT 2014

**Form No.5**

**CLINKER GROUND WITH GYPSUM  
(DAILY COMPOSITE SAMPLE)  
(COLUMN 5 OF TABLE 1)**

Laboratory Ball Mill Testing is required to be done when there is change in the Source of Raw Material or change in Design

<b>Date of grinding</b>	<b>Finenes s</b>	<b>Soundness (Le- chatelier/ Autoclave method)</b>	<b>Setting Time Initial (IST)</b>	<b>Setting Time Final (FST)</b>	<b>Compre hensive Strength 3 7 28 ..days..</b>	<b>Sample/ pass/fail</b>	<b>Remarks</b>

Prepared by	Approved by	Page of Page 9 of 13
-------------	-------------	----------------------



NEPAL BUREAU OF STANDARDS AND METROLOGY  
NEPAL PRODUCT CERTIFICATION SCHEME

STI

DOC:STI/49/

ISSUE 01

15 SEPT 2014

**Form No.6**  
**CEMENT GRINDING (DAILY/WEEKLY COMPOSITE SAMPLES)**  
**(COLUMN 6 OF TABLE 1)**

Date of grinding	LO I	IR	SO <sub>3</sub>	Mgo	Cao	Al <sub>2</sub> O <sub>3</sub>	Fe <sub>2</sub> O <sub>3</sub>	SiO <sub>2</sub>	LSF	Alu mina	Finne ss	Soundness	Setting time IST/FST	Compressive strength 3,7.28 days	Sample pass/fail	Remarks

Prepared by


Approved by

Page of Page 10 of 13

	NEPAL BUREAU OF STANDARDS AND METROLOGY NEPAL PRODUCT CERTIFICATION SCHEME	STI
DOC:STI/49/	ISSUE 01	15 SEPT 2014

**Form No.7**  
**CEMENT GRINDING (FOR ALTERNATE HOURLY SAMPLES)**  
**(Column 6 of Table 1)**

Date of grinding	Time	Fineness	Setting Time		Sample Pass/Fail
			Initial Setting Time (IST)	Final Setting Time (FST)	

	NEPAL BUREAU OF STANDARDS AND METROLOGY NEPAL PRODUCT CERTIFICATION SCHEME	STI
DOC:STI/49/	ISSUE 01	15 SEPT 2014

~~~~~**Form No.8**  
**PACKING STAGE (CEMENT)**  
**(DAILY/WEEKLY AVERAGE SAMPLE (COLUMN 7 OF TABLE 1))**

| Date of grinding | LO I | IR | SO <sub>3</sub> | Mgo | Cao | Al <sub>2</sub> O <sub>3</sub> | Fe <sub>2</sub> O <sub>3</sub> | SiO <sub>2</sub> | LSF | Alumina | Finness | Soundness | Setting time IST/FST | Compressive strength 3,7,28 days | Sample pass/fail | Remarks |
|------------------|------|----|-----------------|-----|-----|--------------------------------|--------------------------------|------------------|-----|---------|---------|-----------|----------------------|----------------------------------|------------------|---------|
|                  |      |    |                 |     |     |                                |                                |                  |     |         |         |           |                      |                                  |                  |         |



NEPAL BUREAU OF STANDARDS AND METROLOGY  
NEPAL PRODUCT CERTIFICATION SCHEME

STI

DOC:STI/49/

ISSUE 01

15 SEPT 2014

**Form No.9**

| <b>Sl. No</b> | <b>Date of calibration</b> | <b>Calibration Record</b>                                                                                                                                                                         | <b>Name of equipment</b>                         | <b>Sl.No. (If any)</b> |
|---------------|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|------------------------|
|               |                            | <b>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)</b> | <b>Action taken if equipment found defective</b> | <b>Remarks</b>         |

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

Prepared by

Approved by

Page of Page 13 of 13