

QUALITY CONTROL AND QUALITY ASSURANCE
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1.0 Objective

The objective of this procedure is to ensure quality of works in all construction projects under taken by the organisation. It is the primary responsibility of contractor to ensure quality in construction and it is the collective responsibility of both construction and quality assurance division to assure quality work, while the former will take care of field works, both the divisions will ensure that the tests are conducted as per BIS specifications in reputed laboratories.

1.1 Application

This procedure is applicable to all the projects entrusted to **KSPHC** by the client organization for construction.

2.0 Responsibility

Responsibility and Authority for various activities of Quality control is described in procedure part.

3.0 Terms and definitions

- 1) **Concession** – Permission to use or release a product that does not conform to specified requirement.
- 2) **Deviation Permit** – Permission to depart from the originally specified requirements of a product prior to realization.
- 3) **Document** – Information and its supporting medium.
- 4) **Quality Assurance** – Part of quality management focused on providing confidence that quality requirements will be fulfilled.
- 5) **Quality Characteristic** – Inherent characteristic of a product, process or system related to a requirement.

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- 6) **Record** – Anything (Such as a document or a photograph) providing permanent evidence of or information about past events; it also includes documents in digital form
- 7) **Requirement** – need or expectation that is stated, generally implied or obligatory.
- 8) **Specification** – Document and stated requirements of the product.
- 9) **Verification** – Confirmation, through the provision of objective evidence, that specified requirements have been fulfilled.

4.0 Procedures

Following abbreviations and terms are used in the table

D = Document

R = Record

PR = Procedure

CL = Check list

TP = Test procedure

STD = Relevant BIS

TR = Test Records

CE = Chief Engineer

SE = Superintending Engineer

EE = Executive Engineer

DES = Designs

QC = Quality control

TP = Third party

PRC = Project review committee consisting of

CMD, ED, FA, CE and other designated employees as determined by the CMD / ED.

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4.1 General :

As all the building materials including electrical fittings etc., required for a project are brought by the Contractors, the procedure part details the tests to be conducted by the Contractors on the same and KSPHC functionaries has to verify whether these materials conform to the acceptance criteria or not.

4.2 Planning for quality control

Concerned Executive Engineer of a division who is considered as the project manager shall plan for achieving quality in the construction project using the following guidelines. In this endeavor, he shall delegate required responsibilities and authorities to other staff of the division / sub-division to plan and achieve quality.

Quality control planning for a particular project shall include responsibilities and authorities for the following personnel in the project:

- a) Contractor (or his quality control engineer)
- b) JE / AE / AEEs of sub-divisions
- c) Executive Engineer of the division

It shall be noted that EE-QC / AEE-QC will be playing role to assist the respective divisions in initiating mid-term course corrective action in order to prevent complaints from the client organization with regard to project (Buildings) requirements based on their observations during their site visits.

Concerned Executive Engineer of a division may prepare project specific quality plan (example, type of building / construction techniques adapted may require minimal or enhanced control measures to avoid problems)

Project quality plan shall define:

- a) Nature of quality control / test activity to be performed

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- b) Personnel responsible to perform
- c) Documents (such as BIS Codes, Bill of quantities, Specifications etc.,)
- d) Personnel authorised to approve the results of tests conducted
- e) Personnel authorised to approve deviations and accord concessions or a suitable disposition
- f) Record requirements

4.3 Informative notes

BUILDING MATERIALS AND CONSTRUCTION

The plan may contain more than one means of controlling the quality of various construction materials which may be naturally occurring or produced by the Contractor or obtained from other agencies, for example Coarse aggregates, fine aggregates, bricks etc., The construction materials also includes those manufactured in factories and readily available in open market like cement, Reinforcement steel, electrical materials etc., The Core Plan may describe the methods for controlling and auditing the quality of material procured or produced by the Contractor.

4.4 ELECTRICAL MATERIALS AND CONSTRUCTION

For the purpose of this section, the following definitions apply:

Electrical Work: means any work associated with the installation, modification, removal, inspection, or testing of electrical System Components.

a) Quality Control of Electrical Items

The EE – Electrical shall provide guidelines for the project EE / AEE / AE that describe how the Contractor should carry out quality control for the electrical items and /or groups

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of electrical items that are used in a typical construction contract that includes Electrical Work.

4.5 Inspection by contractor:

For each electrical item or group of electrical items listed, the Contractor shall identify what inspection will be done. As a minimum, the Contractor shall monitor and inspect the work in accordance with Schedule B specifications.

4.6 General Procedure for Quality Assurance :

SI.No.	Responsibility	Activity	D/R	Reference
1	EE (Divisional)	To ensure tested materials are used on works and post those Test reports on the website.	R	Formats F:23-1 to F:23-8
2	EEQC & AEEQC	Verify the Test reports w.r.t materials collected at site on random basis.	R	
3	SE(DES)	To ensure free flow of information between field staff and Head Office		

SE (DES) will inspect the works periodically to ensure compliance to quality. EEQC and AEEQC will independently inspect the works periodically covering most of the major works. In addition, AEEQC will have to conduct soil investigations for proposed buildings within his reach along with the monitoring of laboratory at Head Office. Any deviation noticed by EEQC & AEEQC should be communicated to the concerned EE (Divisional) and AEE (Sub divisional) with proposed corrective action. Differences will be completely sorted out at SE (DES) level and informed to CE only if his intervention is required. All fines, penalties etc will be levied on the contractors only with specific written instructions / approval from CE or higher authorities.

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5.0 Materials**Quality Control of Building / Raw Materials:**

As all the building materials including electrical fittings etc., required for a project are brought by the Contractors, the procedure part details the tests to be conducted by the Contractors on the same and KSPHC functionaries has to verify whether these materials conform to the acceptance criteria or not.

Sl. No.	Responsibility for			Materials to be tested	Sampling Details	Frequency of tests	Permissible limits	Doc / Record Reference
	verification of test reports	approval to test reports	approval to deviations/ Concessions					
1	AEE / AE / JE	EE	CE	Water	i) From local source ii) From outside sources	i) Once before actual usage ii) As and when the source is changed	As per F:23-1	F:23-1
2	AEE / AE / JE	EE	CE	Cement	One sample for every 75 tonnes or when the brand is changed	i) Fineness ii) Initial Setting Time iii) Final Setting Time iv) Compressive Strength	As per F:23-2	F:23-2
3	AEE / AE / JE	EE	CE	Reinforcement Steel	For every 30 tonnes of same diameter	i) Tensile strength ii) Yield stress iii) Percentage elongation	As per F:23-3	F:23-3
4	AEE / AE / JE	EE	CE	Sand	For every 100 cum of sand received from the same source	Grading Zone Analysis Deleterious materials	As per F:23-4	F:23-4
5	AEE / AE / JE	EE	CE	Coarse aggregate	For every 100 cum of CA brought from same source	Test for gradation	As per F:23-5	F:23-5

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Sl. No.	Responsibility for			Material s to be tested	Sampling Details	Frequency of tests	Permissible limits	Doc / Record Reference	
	verification of test reports	approval to test reports	approval to deviations/ Concessions						
6	AEE / AE / JE	EE	CE	Burnt clay bricks	For every 25,000 bricks or when the source / brand is changed	i)Water absorption ii)Compressive strength iii) Test for Dimensions	As per F:23-6	F:23-6	
7	AEE / AE / JE	EE	CE	Laterite	For every 2000 laterite stones or when the source / brand is changed	i)Compressive strength ii)Water absorption	As per F:23-7	F:23-7	
8	AEE / AE / JE	EE	CE	Hollow Concrete Blocks	For every 5000 blocks or when the source / brand is changed	Compressive strength	As per Agreement Document	As per IS 2185 (part-1)-1979	
9	AEE / AE / JE	EE	CE	Solid Concrete Blocks	For every 5000 blocks or when the source / brand is changed	Compressive strength	As per Agreement Document	As per IS 2185 (part-1)-1979	
10	AEE / AE / JE	EE	CE	Concrete Cubes	Quantity in m ³	No. of Samples	Compressive strength	As per F:23-8	F:23-8
					1-5	1			
					6-15	2			
					16-30	3			
					31-50	4			
51 & Above	4+one additional sample for each 50 m ³ or part thereof.								

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Sl. No.	Responsibility for			Materials to be tested	Sampling Details	Frequency of tests	Permissible limits	Doc / Record Reference
	verification of test reports	approval to test reports	approval to deviations/ Concessions					
11	AEE / AE / JE	EE	CE	M.S Door frames, window frames	5 % of the materials to be tested for a. Dimension b. Workmanship c. Fixtures for method of hinging	Physical measurement, Physical observation, Physical verification	As per Agreement	
12	AEE / AE / JE	EE	CE	Water closets, Wash basins, Urinal basins	10 % of the materials to be tested for a. Brand name as per agreement b. ISI marking	Physical verification Physical verification	As per Agreement / Specification	
13	AEE / AE / JE	EE	CE	G.I pipes	10 % of the materials to be tested for Specifications	Physical measurement, Physical measurement Physical observation	As per Agreement / Specification	
14	AEE / AE / JE	EE	CE	G. I Fittings, Peet valves, CI pipes, PVC pipes	10 % of the materials to be tested for a. ISI marking b. Brand name (wherever applicable)	Physical observation Physical observation	As per Agreement / Specification	
15	AEE / AE / JE	EE	CE	Taps	10 % of the materials to be tested for ISI marking	Physical observation	As per Agreement / Specification	

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Sl. No.	Responsibility for			Material s to be tested	Sampling Details	Frequency of tests	Permissible limits	Doc / Record Reference
	verification of test reports	approval to test reports	approval to deviations/ Concessions					
16	AEE / AE / JE	EE	CE	Glazed wall tiles	2% of the materials to be tested for a. Dimension b. Uniformity of colour, shade and texture c. Verification of marking on the packing box and tiles	Physical measurement Physical observation Physical observation	As per Agreement / Specification	
17	AEE / AE / JE	EE	CE	Ceramic tiles	2% of the materials to be tested for a. Dimension b. Uniformity of colour, shade and texture c. Verification of marking on the packing box and tiles	Physical measurement Physical observation Physical observation	As per Agreement / Specification	
18	AEE / AE / JE	EE	CE	Eco – Board door shutters / PVC door shutters	10% of the materials to be tested for a. Dimension b. Workmanship c. Fixtures d. Manufacturer's test certificate	Physical measurement Physical observation Physical measurement / Verification Verification	As per Agreement / Specification	
19	AEE / AE / JE	EE	CE	Flush shutters for door	10% of the materials to be tested for a. Dimension b. Manufacturer's test certificate	Physical observation Physical verification	As per Agreement / Specification	

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6.0 Quality Plan for construction activities:

As all the building construction activities including electrical works etc., are carried out by the Contractors, the procedure part details the documents to be referred by the KSPHC functionaries to verify whether these works conform to the requirement or not. For the projects costing more than 200 lakhs Quality plan shall be prepared by the concerned 3rd party quality control agency and verified by KSPHCL concerned officials.

Sl No.	Responsibility	Activity	DOCUMENTS INVOLVED
1	JE / AE / AEE / EE	Excavation of foundation	1) Excavation plan / Building plan 2) Specification in the agreement documents
2	JE / AE / AEE / EE	Foundation concreting	1) Specification in the agreement documents 2) Construction drawings
3	JE / AE / AEE / EE	Random rubble stone masonry and C.R stone masonry	1) Specification in the agreement documents 2) Construction drawings
4	JE / AE / AEE / EE	Brick Masonry work	1) Specification in the agreement documents 2) Construction drawings
5	JE / AE / AEE / EE	Reinforced cement concrete	1) Specification in the agreement documents 2) Construction drawings
6	JE / AE / AEE / EE	Joineries	1) Specification in the agreement documents 2) Construction drawings
7	JE / AE / AEE / EE	Finishing including plastering and painting works	1) Specification in the agreement documents 2) Construction drawings
8	JE / AE / AEE / EE	Water Supply works	1) Specification in the agreement documents 2) Construction drawings
9	JE / AE / AEE / EE	Sanitary works	1) Specification in the agreement documents 2) Construction drawings
10	JE / AE / AEE / EE	Electrical works	1) Specification in the agreement documents 2) Construction drawings

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7.0 Plan for conducting quality control inspection by Quality Control Division

As all the building construction activities including electrical works etc., are carried out by the Contractors and regular supervision on day to day basis are carried out by various functionaries of the construction / electrical Divisions, the procedure part details the inspection plan for the KSPHCs Quality Control functionaries to verify whether the raw materials / works conform to the requirement or not. If the QC/QA activities are outsourced, then QC exercises required control on the subcontracted agencies as defined in respective work orders.

Sl. No.	Activity	Responsibility	Description	Frequency / Duration
1	Planning of Inspection	EE(QC)	a. The QC Division shall plan and schedule the inspections of QC staff for the ongoing works	Every Month as per approved inspection program
			b. The various works required to be inspected by QC staff may also be identified by the Top Management, based on the criticality of works or any other reason	As and when directed by the Top Management
2	Inspection	EE(QC)/ AEE(QC)/ AE(QC)/JE(QC)	a. QC staff shall visit the site of the work to be inspected and conduct inspection of the Building Materials / Test reports / works	10% of the works shall be inspected and as per priority of management
			b. Any deviations noticed by QC staff should be communicated to concerned EE/AEE through e-mails / Inspection notes with proposed corrective action.	F : 23-9 /Inspection notes to be issued within 10 days from the date of site Visit.
3	Action Taken report	EE (Division)	The concerned EE (Division) shall send action taken report on the QC findings / observations after attending to the necessary corrective actions to SE (DES) with copies to EEQC & AEEQC	Within 15 days from the date of observation / issue of Inspection notes

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		SE (DES)	The ATR shall then be verified in subsequent inspections	
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Third party Quality control Inspection should be carried out for all works contract of estimated value more than Rs200 lakhs and all goods contract costing more than Rs25lakhs. This is as per GOK'S GO No. FD 55Pro.cell 2004 Dtd 17.02.2005. Ref.Contract documents.

8.0 Reference

- a) ISO 9001: 2008 Clause Number 8.2.4
- b) IMS Manual Clause Number 8.2.4

9.0 Associated Documents

- a) Procedure for control of documents IMSP 01
- b) Procedure for control of records IMSP 02
- c) Procedure for control of monitoring and measuring devices IMSP 13
- d) Procedure for control of non conforming products IMSP 15
- e) Procedure for corrective preventive action IMSP 27

10.0 Revisions

This document supersedes and replaces QSP 23. This document being part of the integrated management system, it is designated as IMSP 14 and the revision status is set to "0".

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Approved by: Chairman and Managing Director