



BIHAR STATE POWER TRANSMISSION COMPANY LIMITED

FIELD QUALITY PLAN

Item	Civil works for site Packages
Applicability	BSPTCL PROJECTS
Date of Issue	15.01.2016
Validity	Till next revision

FQP No.	003
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S. No.	Description of Activity	Items to be Checked	Tests/Checks to be done	Ref. documents	Check/Testing		Counter Check/Test by BSPTCL	Accepting authority in BSPTCL
					Agency	Extent		
1.	Earth Work (site leveling)							
		1. Mandatory testing for filling						
			1. Proctor compaction test for maximum dry density	IS:2720(part-7) & Specification	Contractor from BSPTCL approved Lab.	One sample per 25000 Cu. m. for each type & source of filling material.	100% review of lab test results	Site In charge
			2. Optimum Moisture Content	do	Contractor/ From BSPTCL approved Lab.	do	do	do
		2. Field Compaction Test	1.Field dry density & Moisture content test for each layer of compaction.	IS:2720 (part-29), & BSPTCL Specification	Contractor Field lab./ BSPTCL approved Lab.	One sample for every 2500 sqm. or part there of for compacted soil for each compacted layer.	do	do
2.	Civil works							
	A. Materials	1. Cement	1. Brand approval	Cement of approved brands by BSPTCL web site may be procured.	Contractor	As proposed by Contractor	Any new brand cement proposed by Contractor shall be submitted to BSPTCL for approval	BSPTCL-HQ
			2. Physical tests	As per document at Annexure-I of this FQP	Contractor Samples to be taken jointly with BSPTCL and tested at BSPTCL accepted lab.	-Review of 100% MTC's -One sample of each brand from one manufacturing unit for each contract. (Further refer note-17 at page 23). (If cement is stored for more than 3 months, testing is to be	100% review of lab test results Test results shall be sent by the Lab, by E mail directly to BSPTCL; further, hard Copy of Test Certificate shall also be sent by the Lab directly to BSPTCL by Postal Address.	Site in charge



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					Check/Testing			
					Agency	Extent		
			3. Chemical Tests. Chemical composition of Cement	-do-	Contractor to submit MTC	Review of all MTC	100% review of MTC results	Site In charge
		2.a) Reinforcement Steel	1. Source approval	- May be procured from main producers directly or through authorized dealers who can produce MTC from main producers with traceability.	Contractor	As proposed by contractor	Material shall be supplied from Main Producers / authorized dealers.	Site in charge.
			2. Physical and Chemical analysis test	As per annexure-2 of this FQP	Contractor to submit MTC.	Review of 100% MTC One sample* / 500 MT / Manufacturer shall be jointly sealed by BSPTCL and tested at BSPTCL approved Lab. *Note: All sizes of 10 mm and above shall be taken for testing in every 500MT.	-100% review of MTC, Review of lab test results. Test results shall be sent by the Lab, by E mail directly to BSPTCL; further, hard Copy of Test Certificate shall also be sent by the Lab directly to BSPTCL by Postal Address.	Site In charge



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					Agency	Extent		
		2.b) Structural steel. For roof truss, door & window frames, boundary wall, gates, grills, railings gratings & rolling shutter etc.	Source to be proposed by contractor.	BSPTCL Specification	Contractor	As proposed by contractor	To verify documents.	Site In charge
			1. Visual & Dimensional check for damages, rusting & pitting, welding, primer coating, painting/ galvanizing as applicable.	BSPTCL specification and approved drawing	Contractor	100%	random	Site Engineer
			2. Physical properties a) Structural steel (except tubular pipes)	IS:2062 BSPTCL specification and approved drawing	Contractor	1 sample per 20 MT or part thereof for tensile and bend test of each size. Samples to be tested in BSPTCL accepted lab. (Mini. Qty. required for testing is 20 MT))	Review of lab. test results by BSPTCL.	Site In charge
			b) Steel Tubular pipes	IS:2062 BSPTCL	Contractor	1 sample per 8 MT or part	Review of lab. test results by	Site In charge



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				specification and approved drawing		thereof for tensile and bend test of each size. Samples to be tested in BSPTCL accepted lab. (Mini. Qty. required for testing is 8 MT)	BSPTCL.	
		3. Coarse Aggregates	1. Source approval	Source meeting BSPTCL Specification	Contractor	Proposed by the Contractor, indicating the location of the quarry and based on the test results of Joint samples tested in BSPTCL accepted lab.	To review the proposal based on the documents	Project In-charge. Once approved, the particular quarry shall be used for all the running contracts under various Packages .
			2. Physical tests	As per document at Annexure-3 of this FQP	Contractor	One sample per 200 cum or part thereof, samples to be tested by Contractor in BSPTCL accepted Lab.	100% review of test results. Out of these 100% samples, BSPTCL shall witness at TPL, 5 samples selected at random, spread during the overall execution period of contract.	Site Engineer
		4. Fine aggregate	1. Source approval	Source meeting BSPTCL Specification	Contractor	Proposed by Contractor, indicating the location of the quarry and based on the results of Joint samples tested in BSPTCL accepted lab.	To review the proposal based on the documents.	Project In-charge. Once approved, the particular source shall be used for all the running contracts under various Packages .



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					Agency	Extent		
			2. Physical test	As per Annexure-4 of this FQP	Contractor	One sample per 200 cum or part thereof, samples to be tested by contractor in BSPTCL accepted Lab.	100% review of test results Out of these 100% samples, BSPTCL shall witness 5 samples selected at random, spread during the overall execution period of contract.	Site Engineer
		5. Water	1. Cleanliness	BSPTCL Specification (Water shall be fresh and clean)	Contractor	100% visual check at Field	Verification at random	Site Engineer
			2. PH Value	- do -	Contractor	One sample per source	100% review of the test results Ph value not less than 6	Site Engineer
	B.Concreting							
		1.Workability (For concreting not less than 1:3 : 6)	Slump test	Range 25-75mm refer document at annex -5 of this FQP.	Contractor	Minimum 01 sample per day / conc. mixer	20% check at random	Site Engr.



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					Agency	Extent		
		2. Concrete Strength (For R.C.C.)	Cubes Compressive Strength	As per annexure-5 of this FQP.	Contractor Casting of cubes at site. Cubes to be tested for 7 days & 28 days strength at BSPTCL appd. Lab / BSPTCL Lab/At site- if testing machine installed by contractor is duly calibrated by NABL lab. Cubes at 100% location are to be taken in presence of BSPTCL officials	One sample of 3 cubes for every 20 Cum or part thereof. (Mini. Qty. required for testing is 5 cu. m. for each day of concrete)	100% review of lab test results. Cubes at 100% location are to be taken in presence of BSPTCL officials. Normally testing shall be carried out at the Cube Testing Facility installed at BSPTCL premises, in the witness of BSPTCL. Alternatively, samples shall be tested at BSPTCL approved Labs. In this case, test results shall be sent by the Lab, by E mail directly to BSPTCL; Further, hard Copy of Test Certificate shall also be sent by the Lab directly to BSPTCL by Postal Address. Further, BSPTCL to witness testing on 20% samples and also to review 100% test results.	Site Engineer. 10% samples to be witnessed by BSPTCL Site Engineer and at least 5% samples at random, shall be witnessed by Site In-charge. In-case of Site/ BSPTCL Lab, 100% witness by BSPTCL representative.



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					Agency	Extent		
	c) Back filling	Watering & Ramming for compaction	a) Visual	BSPTCL Spec	Contractor	100%	Random	Site Engineer
			b) Compaction	BSPTCL Spec	Contractor	Back filling is to be done by watering and ramming for desired compaction (to be ascertained by site in charge)	100%	Site In charge
3.	Brick Masonry							
		a) BRICKS	1. Dimensional tolerance	BSPTCL Specification/ enclosed annexure-6	Contractor (samples to be taken jointly and tested in BSPTCL accepted lab)	Enclosed Annexure -6	Review 100% of test results	Site In charge
			2. Compressive strength	BSPTCL Specification / enclosed annexure-6	-Do-	-Do-	-do-	Site In charge
			3. Water Absorption	BSPTCL Specification / enclosed annexure-6	-Do-	-Do-	-do-	Site In charge
			4. Efflorescence	BSPTCL Specification/ enclosed annexure-6	-Do-	-Do-	-do-	Site In charge



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					Agency	Extent		
4.	Stone for Masonry							
		Stone	1.Compressive Strength	IS: 1121 (Part-I) & CPWD Specification clause 7.1 Stone with round surface shall not be used	Contractor (samples to be taken jointly and tested in BSPTCL accepted lab)	One sample pre source	random	Site In charge
			2. Water Absorption	IS: 1124-1974 & CPWD Specification clause 7.1 Stone with round surface shall not be used	Contractor (samples to be taken jointly and tested in BSPTCL accepted lab)	One sample pre source	random	Site In charge
5.	Tiles for Floorings & walls	1.Terrazo Tile	1.Wet Transverse Strength 2. Water Absorption 3. Abrasion Test	IS: 1237 & BSPTCL Specification/ enclosed annexure-7	Samples to be taken jointly and tested in BSPTCL accepted lab	One sample for every 10000 tiles or part thereof / enclosed annexure-7	100% review of the test results.	Site In charge.
		2.Glazed tiles 3.Vitrified Tiles	1.Water Absorption 2.Crazing Test 3.Impact Test Strength	IS: 15622 & BSPTCL Specification	Samples to be taken jointly and tested in BSPTCL accepted lab	One sample for every 3000 tiles or part thereof. (Minimum quantity of material for carrying out test is 3000 nos.)	100% review of the test results.	Site In charge.
6.	Finishing materials of building	Type / quality /class of finishing building material	Physical verification of Different items as per specification	BSPTCL Specification	Contractor	100%	MTC/Manufacturer catalogue To be reviewed.	Site In charge.



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					Agency	Extent		
7.	Timber							
		1.Timber for Door & Window Frame	1. Moisture content	IS: 287 & CPWD Specification	Samples to be taken jointly and tested	One sample per cu. m or part thereof (No testing required below 1 cu.m.)	100% review of the test results.	Site In charge.
		2. Flush Door shutters (factory made)	1.End Immersion Test 2. Knife Test 3.Glue Adhesion Test	BSPTCL Specification	Samples to be taken jointly and tested in BSPTCL accepted lab	One sample for every 50 shutters or part thereof. (Mini. qty. of shutters for carrying out the test shall be 26 nos.)	100% review of the test results.	Site In charge.
8.	Aluminum Door & window sections	1. Anodic coating	Coating	IS:5523 BSPTCL specification, approved drawings and CPWD specification	Contractor	One sample for every 200 Kgs or part thereof. (Mini. Qty. required for testing is 100 kgs.)	100% review of the test results	Site Engineer
9.	G.S. Barbed Wire	G.S. Barbed Wire	1. Visual Check 2. Dimensions, Weight & Size.	IS:278, BSPTCL specification & CPWD specification. Refer annexure-7 of this FQP.	Contractor Contractor	100% As per sampling plan at Annexure-7	Random Random	Site Engineer Site Engineer



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					Agency	Extent		
			3. Tensile test, zinc coating test and ductility test	IS:278, BSPTCL specification & CPWD specification. (Refer annexure-7 of this FQP)	Manufacturer's MTC / Third Party lab	As per sampling plan at annex-7	Review of manufacturer's test certificates	Site Engineer
10.	Road (WBM layers)							
	Material	A. Coarse Aggregates	1.Source approval	Source with materials meeting BSPTCL Specification	Contractor	Proposed by the Contractor, indicating the location of the quarry and based on the test results of Joint samples tested in BSPTCL accepted lab.	To review the proposal based on the documents	Site In charge
			2.Physical tests	As per document at Annexure-8 of this FQP	Samples to be taken jointly and tested in BSPTCL approved lab.	One sample per 200 cum or part thereof per source. (Mini. Qty. required for testing is 100 cu. m.)	100% review of lab test results	Site In charge
		B) Stone Screening						
			1.Source approval	Source with materials meeting BSPTCL Specification	Contractor	Proposed by the Contractor, indicating the location of the quarry and based on the test results of Joint samples tested in BSPTCL accepted lab.	To review the proposal based on the documents	Site In charge



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					Agency	Extent		
			2. Gradation	As per document at Annexure-8 of this FQP	Samples to be taken jointly and tested in BSPTCL accepted lab.	One sample per 100 cum or part thereof. (Mini. Qty. required for testing is 50 cu. m.)	100% review of lab test results	Site In charge
		C) Binding Material	Plasticity index	As per document at Annexure-8 of this FQP	Contractor	One sample per lot of 50 cu.m. or part thereof. (Mini. Qty. required for testing is 25 cu. m.)	100% review of lab test results	Site In charge
		D) Laying of sub base Course	Physical check	As per CPWD spec clause 17.7.2	Contractor	100%	Random	Site Engineer
		E) Laying of base Course	Physical check	As per CPWD spec clause 17.8.1	Contractor	100%	Random	Site Engineer
11.	Pile foundations	REFER FQP OF SWITCH YARD PILE WORK						



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Annex-1
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ACCEPTANCE CRITERIA AND PERMISSIBLE LIMITS FOR CEMENT

ORDINARY PORTLAND CEMENT					
S. No.	Name of the test	Ordinary Portland Cement 33 grade as per IS 269	Ordinary Portland Cement 43 grade as per IS 8112	Ordinary Portland Cement 53 grade as per IS 12269	Remarks
a)	Physical tests				To be conducted in Appd. Lab
(i)	Fineness	Specific surface area shall not be less than 225 sq.m. per Kg. or 2250 Cm ² /gm.	Specific surface area shall not be less than 225 sq.m. per Kg or 2250 Cm ² /gm.	Specific surface area shall not be less than 225 sq.m. per Kg or 2250 Cm ² /gm.	Blaine's air permeability method as per IS 4031 (Part-2) / Sieve analysis as per IS 4031 (part-3)
(ii)	Compressive strength	72 ± 1 hour : Not less than 16 Mpa (16 N/mm ²) 168 ± 2 hour : Not less than 22 Mpa (22 N/mm ²) 672 ± 4 hour : Not less than 33 Mpa (33 N/mm ²)	72 ± 1 hour : Not less than 23 Mpa (23 N/mm ²) 168 ± 2 hour : Not less than 33Mpa (33 N/mm ²) 672 ± 4 hour : Not less than 43 Mpa (43 N/mm ²)	72 ± 1 hour : Not less than 27Mpa (27 N/mm ²) 168 ± 1 hour : Not less than 37Mpa (37 N/mm ²) 672 ± 1 hour : Not less than 53 Mpa (53 N/mm ²)	As per IS 4031 (Part-6)
(iii)	Initial & Final setting time	Initial setting time : Not less than 30 minutes Final setting time : Not more than 600 minutes	Initial setting time : Not less than 30 minutes Final setting time : Not more than 600 minutes	Initial setting time : Not less than 30 minutes Final setting time : Not more than 600 minutes	As per IS 4031 (Part-5) -do-
(iv)	Soundness	Unaerated cement shall not have an expansion of more than 10mm when tested by Le Chatlier and 0.8% by Autoclave test.	Unaerated cement shall not have an expansion of more than 10mm when tested by Le Chatlier and 0.8% by Autoclave test	Unaerated cement shall not have an expansion of more than 10mm when tested by Le Chatlier and 0.8% by Autoclave test.	Le Chatlier and Autoclave test as per IS 4031 (Part-3)



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S. No.	Name of the test	Ordinary Portland Cement 33 grade as per IS 269	Ordinary Portland Cement 43 grade as per IS 8112	Ordinary Portland Cement 53 grade as per IS 12269	Remarks
b)	Chemical composition tests				Review of MTC only
		a) Ratio of percentage of lime to percentage of silica, alumina & iron oxide 0.66 to 1.02	a) Ratio of percentage of lime to percentage of silica, alumina & iron oxide 0.66 to 1.02	a) Ratio of percentage of lime to percentage of silica, alumina & iron oxide 0.80 to 1.02%	
		b) Ratio of percentage of alumina to that of iron oxide Minimum 0.66%	a) Ratio of percentage of alumina to that of iron oxide Minimum 0.66	a) Ratio of percentage of alumina to that of iron oxide Minimum 0.66%	
		c) Insoluble residue, percentage by mass Max. 4.00%	c) Insoluble residue, percentage by mass Max. 2.00%	c) Insoluble residue, percentage by mass Max. 2.00%	
		d) Magnesia percentage by mass Max. 6%	d) Magnesia percentage by mass Max. 6%	d) Magnesia percentage by mass Max. 6%	
		e) Total sulphur content calculated as sulphuric anhydride (SO ₃), percentage by mass not more than 2.5 and 3.0 when tri-calcium aluminate percent by mass is 5 or less and greater than 5 respectively.	e) Total sulphur content calculated as sulphuric anhydride (SO ₃), percentage by mass not more than 2.5 and 3.0 when tri-calcium aluminate percent by mass is 5 or less and greater than 5 respectively.	e) Total sulphur content calculated as sulphuric anhydride (SO ₃), percentage by mass not more than 2.5 and 3.0 when tri-calcium aluminate percent by mass is 5 or less and greater than 5 respectively.	
		f) Total loss on ignition shall not be more than 5 percent	f) Total loss on ignition shall not be more than 5 percent	f) Total loss on ignition shall not be more than 5 percent	



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S. No.	Name of the test			Remarks
2.	POZZOLANA PORTLAND CEMENT AS PER IS 1489			
a)	Physical tests	i) Fineness	Specific surface area shall not be less than 300 sq.m. per Kg. or 3000 Cm ² /gm	
		ii) Compressive strength	a) 72 ± 1 hour : Not less than 16 Mpa (16 N/mm ²) b) 168 ± 2 hour : Not less than 22 Mpa (22 N/mm ²) c) 672 ± 4 hour : Not less than 33 Mpa (33 N/mm ²)	
		iii) Initial & Final setting time	Initial setting time : Not less than 30 minutes Final setting time : Not more than 600 minutes	
		iv) Soundness	Unaerated cement shall not have an expansion of more than 10mm Le Chatlier test and 0.8% by Autoclave test as per IS 4031 (Part-3)	
b)	Chemical composition tests			
		a) Magnesia percentage by mass Max. 6%		Review of MTCC only
		b) Insoluble material, percentage by mass $x + 4(100-x)/100$ where x is the declared % of pozzolana in the PPC		-do-
		c) Total sulphur content calculated as sulphuric anhydride (SO ₃), percentage by mass not more than 3.0		-do-
		Total loss on ignition shall not be more than 5 percent		



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Annex-2

ACCEPTANCE CRITERIA AND PERMISSIBLE LIMITS FOR REINFORCEMENT STEEL AS PER IS 1786-1985 Edition-4.3 (2004-12)

S. No.	Name of the test	Fe 415	Fe 500
i)	Chemical analysis test		
	Carbon	0.30 Percent Maximum	0.30 Percent Maximum
	Sulphur	0.060 Percent Maximum	0.055 Percent Maximum
	Phosphorus	0.060 Percent Maximum	0.055 Percent Maximum
	Sulphur & Phosphorus	0.11 Percent Maximum	0.105 Percent Maximum
ii)	Physical tests		
	a) Tensile Strength Minimum	10% more than actual 0.2% proof stress but not less than 485 N/Sq.mm.	8 % more than actual 0.2% proof stress but not less than 545 N/Sq.mm
	b) 0.2% of proof stress/Yield stress Minimum, N/mm ²	415	500
	c) Elongation percent , Minimum	14.5	12
iii)	Bend & Re-bend tests	Pass	Pass



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Annex-3

ACCEPTANCE CRITERIA AND PERMISSIBLE LIMITS FOR COARSE AGGREGATES AS PER IS 383

3.	Coarse Aggregates										
i)	Physical Tests										
	a) Determination of particles size	a. IS Sieve Designation	%age passing for Single-Sized Aggregate of nominal size					Percentage Passing for grades Aggregate of nominal size			
			40 mm	20 mm	16 mm	12.5 mm	10 mm	40 mm	20 mm	16 mm	12.5 mm
		63 mm	100	-	-	-	-	-	-	-	-
		40 mm	85 to 100	100	-	-	-	95 to 100	100	-	-
		20 mm	0 to 20	85 to 100	100	-	-	30 to 70	95 to 100	100	100
		16 mm	-	-	85 to 100	100	-	-	-	90-100	-
		12.5 mm	-	-	-	85 to 100	100	-	-	-	90 to 100
		10 mm	0 to 5	0 to 20	0 to 30	0 to 45	85 to 100	10 to 35	25 to 55	30 to 70	40 to 85
		4.75 mm	-	0 to 5	0 to 5	0 to 10	0 to 20	0 to 5	0 to 10	0 to 10	0 to 10
		2.36 mm	-	-	-	-	0 to 5	-	-	-	-
	b.	Flakiness index		Not to exceed 25%							
	c.	Crushing Value		Not to exceed 45%							
	d.	Presence of deleterious material		Total presence of deleterious materials not to exceed 5%							
	e.	Hardness		Abrasion value not more than 40%, Impact value not more than 30%							
	f.	Soundness test (for concrete work subject to frost action)		12% when tested with sodium sulphate and 18% when tested with magnesium sulphate							



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Annex-4

ACCEPTANCE CRITERIA AND PERMISSIBLE LIMITS FOR FINE AGGREGATES AS PER IS 383

4. Fine aggregates					
i)	Physical Tests	IS Sieve Designation	Percentage passing for graded aggregate of nominal size		
			F.A. Zone I	F.A. Zone II	F.A. Zone III
	a) Determination of particle size				
		10 mm	100	100	100
		4.75 mm	90-100	90-100	90-100
		2.36 mm	60-95	75-100	85-100
		1.18 mm	30-70	55-90	75-100
		600 microns	15-34	35-59	60-79
		300 microns	5 to 20	8 to 30	12 to 40
		150 microns	0-10	0-10	0-10
	b) Silt content		Not to exceed 8%	Not to exceed 8%	Not to exceed 8%
	c) Presence of deleterious material	Total presence of deleterious materials shall not exceed 5%			
	d) Soundness Applicable to concrete work subject to frost action	12% when tested with sodium sulphate and 15% when tested with magnesium sulphate			



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ACCEPTANCE CRITERIA AND PERMISSIBLE LIMITS FOR CONCRETE WORK

1)	Concrete	a) Workability	Slump shall be recorded by slump cone method and it shall be between 25-75 mm. depending upon workability requirement as per IS 456.
		b) Compressive strength	For Design mix as per IS:456 for Grade M20 or above For nominal (volumetric) concrete mixes compressive strength for 1:1.5:3 (Cement : Fine aggregates : Coarse aggregates) concrete 28 days strength shall be min 265Kg/cm² and for 1:2:4(Cement: Fine Aggregate: Coarse aggregate) nominal mix concrete 28 days strength shall be min 210Kg/cm².

Notes :

- 1) All Design Mix concrete shall be as per IS: 456
- 2) ACCEPTANCE CRITERIA BASED ON 28 DAYS COMPRESSIVE STRENGTHS FOR DESIGN MIX CONCRETE: AS PER Table-11 of IS:456 as given below:

Specified Grade	Mean of the Group of 4 Non-Overlapping consecutive test results in N/sq mm	Individual Test Results in N/sq mm
M 20 or above	Shall be greater than or equal to $f_{ck} + 0.825 \times \text{established standard deviation (rounded off to nearest 0.5 N/sq mm)}$ * Or $F_{ck} + 3 \text{ N/sq mm}$, whichever is greater	$\geq f_{ck} - 3 \text{ N/sq mm}$

* Established value of standard deviation shall be determined based on Note of Table-11 of IS:456

- 2) In case of design mix, necessary approvals are required to be taken by Engineer In-charge.
- 3) **ACCEPTANCE CRITERIA BASED ON 28 DAYS COMPRESSIVE STRENGTHS FOR NOMINAL MIX CONCRETE:**
 - a) On the basis of mandatory lab test result, in case of actual average compressive strength being less than specified strength but up to 70% of specified strength, concrete may be accepted and the rate payable shall be in the same proportion as the actual average compressive strength bears to specified compressive strength.
 - b) If the actual average strength of accepted sample is less than 70% of specified strength, the Site-in-charge shall reject the defective portion of work represented by sample and nothing shall be paid for the rejected work. Remedial measures necessary to retain the structure shall be taken at the risk and cost of contractor. If, however, the Engineer-in-charge / Project In-charge so desires, he may order additional tests to be carried out to ascertain if the structure can be retained/rectified. All the charges in connection with these additional tests shall be borne by the Contractor.



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- c) 53 Grade cement shall be used after obtaining specific approval of the Engineer In charge.
- d) Portland slag cement conforming to IS: 455 may be used as per Technical Specification.



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SAMPLING PLAN FOR BRICK-WORK

Scale of sampling and permissible number of defectives for visual and dimensional characteristics.

No of Bricks in the lot	For characteristics specified for individual bricks		For Dimensional characteristics for group of 20 bricks- No of bricks to be selected
	No of bricks to be selected	Permissible no of defective in the sample.	
(1)	(2)	(3)	(4)
2001-10000	20	1	40
10001-35000	32	2	60
35001-50000	50	3	80

Note : For a particular work where less than 5000 nos. of bricks are to be used, only visual checks are to be done.

Scale of sampling for physical characteristics

Lot size	Sampling size for compressive strength water absorption and efflorescence	Permissible No of defectives for efflorescence
(1)	(2)	(3)
2001-10000	5	0
10001-35000	10	0
35001-50000	15	1



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ACCEPTABLE CRITERIA FOR BRICK WORK

1) Dimensional Tolerances: The dimensions of modular/ Non modular bricks when tested shall be within the following limits per 20 bricks.

S.No	DESCRIPTION	MODULAR BRICKS	NON-MODULAR BRICKS
1	LENGTH	372 to 388 cm (380± 8 cm)	432 to 468 cm (450 ± 18)
2	WIDTH	176 to 184 cm (180± cm)	213 to 231cm (222± 9)
3	HEIGHT	176 to 184 cm (180± 4 cm)	134 to 146 cm (140 ± 6)

2) Compressive strength: the bricks shall have a minimum average compressive strength as specified in BSPTCL specification. The compressive strength of any individual brick tested shall not fall

below the min. average compressive strength specified for the corresponding class of brick by more than 20% . in case compressive strength of any individual brick tested exceeds the upper limit

specified for the corresponding class of bricks, the same shall be limited to upper limit of the class as specified for the purpose of calculating the average compressive strength.

3) Water absorption : The average water absorption of bricks shall not be more than 20% by weight.

4) Efflorescence : The rating of efflorescence of bricks shall not be more than moderate.



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TESTING FOR TERRAZZO TILES

Sl.No.	Frequency of testing	Minimum quantity of material for carrying out Test
1.	One test for every 10000 nos. or part thereof for each type and size from a single manufacturer.	5000nos. (no testing need be done if total number tiles of all the types of all sizes from all manufacturers used in a work is less than 5000)

TABLE – I : SAMPLING FREQUENCY FOR BARDED WIRE

S.No.	NUMBER OF REELS IN THE LOT	NO. OF REELS TO BE SELECTED FOR SAMPLING
1.	UPTO 25	3
2.	26 TO 50	4
3.	51 TO 150	5
4.	151 TO 300	7
5.	301 AND ABOVE	10

TABLE – II : ACCEPTABLE TENSILE PROPERTIES AS PER IS 278

S. NO.	SIZE OF LINE WIRE (MM)	TENSILE STRENGTH OF LINE WIRE N/SQ.MM	MINIMUM BREAKING LOAD OF COMPLETED BARBED WIRE (KN)
1.	2.50	390 TO 590	3.7
2.	2.24	390 TO 590	3.0



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PHYSICAL, REQUIREMENT OF COARSE AGGREGATE

S. No.	Type of Construction.	Type of W.B.M.	Test Method	Requirements
1.	Sub-base	Los Angeles Abrasion Value or Aggregate Impact value	IS:2386(Pt.IV) IS:2386 (Pt.IV) IS:5640***	60% max. * 50% max
2.	Base	a) Los Angeles Abrasion Value or Aggregate Impact value b) Flakiness Index	IS:2386(Pt. IV) IS:2386 (Pt.IV) IS:5640*** IS:2386 (Pt.I)	50% max. * 40% max ** 15% max
3.	Surface Course	a) Los Angeles Abrasion Value or Aggregate Impact value b) Flakiness Index	IS:2386(Pt.IV) IS:2386 (Pt.IV) IS:2386 (Pt.I)	40% max. 30% max 15% max
4	Binding Material	Plasticity index	IS :2720 (Pt V)	Less than 6

* Aggregates may satisfy requirements of either of the two tests

** The requirements of flakiness index shall be enforced only in case of crushed/broken stone and crushed slag.

*** Aggregates like brick metal, kankar and laterite which get softened in presence of water, shall be tested for impact value under wet conditions in accordance with IS:5640.



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GRADING REQUIREMENTS OF COARSE AGGREGATE FOR W.B.M

Grading No.	Size Range	Sieve designation	% by weight passing the sieve
1	90mm to 45mm (Suitable for sub base courses of compacted layer of not less than 90mm thickness).	125mm 90mm 63mm 45mm 22.4mm	100 90-100 25-60 0-15 0-5
2.	63mm to 45mm	90mm 63mm 53mm 45mm 22.4mm	100 90-100 25-75 0-15 0-5
3.	53mm to 22.4mm	63mm 53mm 45mm 22.4mm 11.2mm	100 95-100 65-90 0-10 0-5
4	Screening		
	A) 13.2 mm	13.2 mm 11.2 mm 5.6 mm 180 micron	100 95-100 15-35 0-10
	B) 11.2 mm	11.2 mm 5.6 mm 180 micron	100 90-100 15-35



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General Notes:-

- 1) This Field Quality Plan is not to limit the supervisory checks which are otherwise required to be carried out during execution of work as per drawings/Technical specifications etc.
- 2) Contractor shall be responsible for implementing/documenting the FQP. Documents shall be handed over by the contractor to BSPTCL after the completion of the work.
- 3) Project in charge means over all incharge of work. Site Incharge means incharge of the Site. Site Engineer means in charge of the section.
- 4) In case of deviation the approving authority will be one step above the officer designated for acceptance in this quality plan subject to minimum level of Site incharge.
- 5) Acceptance criteria and permissible limits for tests are indicated in the Annexures. However for further details/tests BSPTCL specification and relevant Indian standards shall be referred.
- 6) Tests as mentioned in this FQP shall generally be followed. However BSPTCL reserves the right to order additional tests wherever required necessary at the cost of the agency.
- 7) All counter checks/tests by BSPTCL shall be carried out by BSPTCL's officials at least at the level of Site Engineer.
- 8) The authorized dealer means the dealer whose names are listed in the main producer's web site or certified by the main producers.
- 9) Accepting Authority for testing Laboratory shall be BSPTCL.
- 10) Mobile testing Labs owned by the contractor may also be acceptable if their facilities meet the testing requirements and the testing equipments are properly calibrated at Third Party Labs where testing/calibration is to be carried out should be accredited by NABL or an agency operating in line with ISO/IEC 17011 and having full membership & MRA of ILAC/APLAC subject to approval of project In charge.
- 11) **READYMIX CONCRETE (RMC) IS ACCEPTABLE FOR USE. HOWEVER, SITE INCHARGE SHALL APPROVE THE SOURCE OF MATERIALS TO BE USED FOR RMC .The documentation to be maintained shall be as per IS 4926:2003 i.e i) Information to be supplied by the purchaser (clause 7)**
 - ii) **Information to be supplied by the producer (clause 8)**
 - iii) **Sampling for concrete strength should be one set of 3 nos of cubes for every 50 cu.m or part thereof for each day of concreting and 28 days compressive strength shall be tested in line with IS:456.**
- 12) Epoxy coating on reinforcement steel wherever required shall be done as per IS 13620.



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- 13) For the items not included in this FQP & TS, please refer PWD code of Govt. of Bihar for mandatory testings. For the items not included in FQP, TS & PWD code, please refer CPWD code for mandatory testings.
- 14) A source of material for aggregate (coarse & fine), bricks, masonry stone, structural steel and cement once approved for a work in the project site, same shall be considered as an approved source for other works also, if there is no change in quarry, supplier source.
- 15) For a particular work, if total wt. of steel of dia.8-12mm is less than 250 kgs. and total wt. of steel of dia.16-32mm is less than 500 kgs., no MTC/ testing is required.
- 16) For a particular work if total consumption of cement in the work is 20MT or below, no MTC/ no third party testing is required.
- 17) In case Reinforcement Steel is procured from other approved manufacturer (other than main producers), as mentioned in compendium of vendors, BSPTCL shall select the samples from offered lot at their factory / stock yard and witness tests at their factory / third party lab. (TPL) approved by BSPTCL, as per IS:1786 (latest revision).
- 18) Cement is to be used in the order it is delivered (ie. First in First Out). Cement bought to works shall not be more than 6 weeks old from the date of manufacture. In case the cement remains in storage for more than 3 months, the cement shall be retested before use and shall be rejected, if it fails to conform to any of the requirements given in the relevant Indian Standard. Cement shall be packed in bags and stored in accordance with the provisions in IS -4082.
- 19) If e-mail facility is not available in BSPTCL approved Lab, report may be collected directly by BSPTCL / Speed Post / Register Post / UPC.
- 20) In case any Laboratory refuses to allow BSPTCL representative for witnessing the test, same shall be taken in writing and approved by BSPTCL-HQ.
- 21) **Bidders should thoroughly go through the QAP, MQP & FQP prior to submission of proposal of bids. No extra claim on account of implementation of this QAP, MQP & FQP under any circumstances shall be entertained. All destructive tests, wherever required in compliance of the MQP & FQP shall be done by the contractor without extra cost implications. These MQP & FQP shall be applicable for all the contracts. However the BSPTCL reserves the rights to waive off any testing at its discretion in the interest of the progress of the projects.**