



# **PIMPRI CHINCHWAD MUNICIPAL CORPORATION, PIMPRI**

**APPROVED REVISED QUALITY ASSURANCE PLAN ( QAP )**

**FOR FOLLOWING COMODITIES**

**(WITH EFFECT FROM 27/05/2013)**

- 1 - EARTH WORK**
- 2 - WBM AND BBM**
- 3 - GSB AND WMM**
- 4 - ASPHALT WORK ( LBM,BM,DBM,SDBC,BC,OGPC,MSS AND PSC)**
- 5 - PAVING BLOCK WORK**
- 6 - STORM WATER AND PIPE DRAINAGE WORK**
- 7 - BUILDING WORK**

CON-Contractor

TPIA- Third Party Inspection Agency

PCMC- Pimpri Chinchwad Municipal Cor.

Tender No. - HO-5-27-2017-2018

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# EARTHWORK MATERIAL QAP

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**Quality Assurance Plan For Road Construction Works For PCMC, PUNE.**

<b>EARTHWORK MATERIAL QAP</b>									
Item	Tests to be Performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
						CON	TPIA	PCMC	
Earth-work Soil	1) Soil Classification	Lab test	MORTH Clause No.305.2	Other than OL, OI, OH or Pt soils	One test per source	-	R	A	
	2) Free swell Index	Lab test	MORTH Clause No.305.2	Less than 50 %		-	R	A	
	3) Liquid limit	Lab test	MORTH Clause No.305.2 & Quality Control notebook.	Not more than 70 %	One test per 1000m3 of soil.	-	R	A	
	4) Plasticity Index	Lab test	MORTH Clause No.305.2 & Quality Control notebook.	Not more than 45 %		-	R	A	



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						CON	TPIA	PCMC	
	5) Visual Inspection	Visual	MORTH Clause No.305.2	Murum should not contain swamps, marshes, bogs, vegetation debris, frozen, combustible and salty materials.	Random	-	W	A	
Note : All material sampling for Lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.									
Continue) Earth-work Soil	6) Maximum Dry Density:	Lab test	Circular of PWD standard specification / Rd. 12 & MORTH TABLE300-1 & Quality	As per PWD Std. / Red book / MORTH	One test per 1000m3 of soil.	P	R	A	If Earthwork item is to be executed as per RD. 13 then Field Dry Density (FDD) & Moisture Content test not required as per PWD RED hand book.

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Item	Tests to be Performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
						CON	TPIA	PCMC	
	For embankment Upto 3.0 M Ht.		Control notebook.	=Min. 1.52gm/cc					
	For embankment exceeding 3.0 mtr. Ht.			=Min. 1.60 gm/cc					
	For top 0.5m ht. of embankment			=min. 1.65gm/cc					
	Subgrade & earthen shoulder			=min. 1.75gm/cc					
Note : All material sampling for Lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.									
Continue) Earth-work Soil	7)Optimum Moisture Content	Lab test	As per PWD Quality control notebook	As per lab Report.	One test per 1000m3 of soil.	-	R	A	

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Item	Tests to be Performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
						CON	TPIA	PCMC	
	8) CBR Value	Lab test	As per PWD Quality control notebook	Depends upon nature of soil however not less than 7%	One test per kilometre				
	9) Soluble sulphate content	Lab test	MORTH Clause No.305.2	Max 1.9 gm per litre	One test per source				
	10) Total sulphate content	Lab test	MORTH Clause No.305.2	Max 0.5 % by mass					

Note : All material sampling for Lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.

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# ACTIVITY - EARTHWORK

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**Quality Assurance plan For Road Construction Works FOR PCMC, Pune**

**ACTIVITY - EARTHWORK**

Sr. No.	Item	Tests to be Performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
							CON	TPIA	PCMC	
1)	Material	#	#	#	#	#	#	#	#	# Filling material to be used in the embankment to be tested for the tests as per the material QAP
<p>The size of the coarse material in the mixture of earth shall ordinarily not exceed 75mm when being placed in the embankment &amp; 50mm when placed in the subgrade as regards the placement of fill material &amp; its compaction to the requirements of these specifications. The maximum particle size shall not be more than two third of the compacted layer thickness. Cutting excavated base surface for embankment should be properly watered, rolled &amp; levelled.</p>										

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**ACTIVITY - EARTHWORK**

Sr. No.	Item	Tests to be Performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
							CON	TPIA	PCMC	
2)	Laying & Compaction	Field Dry density	Field	Rd.12 & MORTH 305	Embankment- Not less than 95% Subgrade & earthen shoulder-Not less than 97%	One set of 3 core samples for every 1000m <sup>2</sup> of each layer	P	R/W	A	##Under mentioned notes are to be adhered to.
<p>Compaction register is to be maintained by the contractor at site. The tests shall be witnessed by SGS randomly and the register reviewed. Necessary testing equipments are to be maintained at site by contractor.</p>										
<p>Note:- An efficient technical personnel is to be maintained at site by the contractor.</p>										

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**ACTIVITY - EARTHWORK**

Sr. No.	Item	Tests to be Performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
							CON	TPIA	PCMC	
2) Continue	Laying & Compaction	Moisture Content while compaction	Field	MORTH Clause No.305.3.5.2	Should not be more than OMC by + 1% or -2%	While conducting FDD check for every layer.	P	R/W	A	
<p>## Breaking of earth clods &amp; embankment material shall be placed in successive horizontal layers of 20cm. to 30cm.depth, extending to the full width of the embankment including the slopes at the level of the particular layer &amp; 30 cm. more on both sides to allow compaction of the full specified section. The extra loose stuff at the edges shall be trimmed later after completion of bank work without cost leaving the correct section fully compacted.</p> <p>Each layer of embakement shall be watered, levelled &amp; compacted to the densities specified in Morth Table 300-2 hereinafter, before the succeeding layer is placed.</p>										
3)	Final Surface	Camber	Field	-	2.5% to 5%	At every 30mtr. interval	P	W	A	
Note:- An efficient technical personnel is to be maintained at site by the contractor.										

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# WATER BOUND MACADAM MATERIAL QAP

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Quality Assurance Plan For Road Construction Works For PCMC, PUNE.									
WATER BOUND MACADAM MATERIAL QAP									
Item	Tests to be Performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
						CON	TPIA	PCM	
60 & 40mm Oversize metal (For WBM)	a) Quality	Field	Rd.20.3.1	As per remark	Random	P	W	A	Metal should be cubical, have sharp edges, hard, tough, sound, durable, clean, dense, close grained & free from soft, decayed & weathered portions.
	b) Abrasion value*	Lab	IS 6579 - 1981	Not more than 50%	1 test /200 m <sup>3</sup> or part thereof	..	R	A	
	c) Impact value*	Lab	IS 6579 - 1981	Not more than 40%		...	R	A	
	d) Water absorption	Lab	IS 6579 - 1981	Not more than 1.5%		...	R	A	
	e) Soundness								
	Na <sub>2</sub> SO <sub>4</sub>	Lab	IS 6579 - 1981	Max. 20%		...	R	A	



Quality Assurance Plan For Road Construction Works For PCMC, PUNE.									
WATER BOUND MACADAM MATERIAL QAP									
Item	Tests to be Performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
						CON	TPIA	PCM	
	MgSO4			Max. 30%					
	f) Flakiness **	Lab	IS 6579 - 1981	Max. 15%		...	R	A	** For 40mm H/B metal only.
	g) Grading for 60mm metal & 40mm metal	Lab / Field	MORTH Clause 404.2.5	AS per MORHT Table 400-7	1 test /100 m3 or part thereof	...	R	A	
Note : All material sampling for Lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.									
MORTH Table 400-7 GRADING REQUIREMENT OF COARSE AGGREGATE									
	Grading No.	Size Range		IS Sieve Designation	Per cent by weight passing				
	1	90 mm to 45 mm		125 mm	100				
				90 mm	90 - 100				

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WATER BOUND MACADAM MATERIAL QAP									
Item	Tests to be Performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
						CON	TPIA	PCM	
				63 mm	25 - 60				
				45 mm	0 - 15				
				22.4 mm	0 - 5				
	2	63 mm to 45 mm		90 mm	100				
				63 mm	90 - 100				
				53 mm	25 - 75				
				45 mm	0 - 15				
				22.4 mm	0 - 5				
	3	53 mm to 22.4 mm		63 mm	100				
				53 mm	95 - 100				
				45 mm	65 - 90				
				22.4 mm	0 - 10				
				11.2 mm	0 - 5				
Hard Murum for WBM	a) Quality	Field	Rd. 23.3.1 & MORTH Clause 305.2.1.4	As per remark	Random	P	W	A	Should be hard & free from soft murum, earth, organic matter & other deleterious or soft



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WATER BOUND MACADAM MATERIAL QAP									
Item	Tests to be Performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
						CON	TPIA	PCM	
									material
	b) Gradation	Field / Lab	MORTH Clause 305.2.1.4	Maximum Partical Size- 50 mm max.	1test per source	P	R	A	
	c) Atterberg limit	Field/ Lab	RD 23 of PWD Standard Specification & MORTH 404.2.6	Liquid Limit=Max. 20 Plasticity Index= Max.6	1test per 25m <sup>3</sup> of binding material	-	R	A	
Note : All material sampling for Lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.									
Soft Murum for WBM	a) Quality	Field	Rd. 24.3.1& MORTH 404.2.6	As per remark	Random	P	W	A	Should be of granular type,free from earth,organic matter,black cotton soil & any other deletetious material
	b) Atterberg	Lab		Liquid Limit=Max. 20 Plasticity Index=	1test per 25m <sup>3</sup> of binding	-	R	A	



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WATER BOUND MACADAM MATERIAL QAP									
Item	Tests to be Performed limit	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
						CON	TPIA	PCM	
				Max.6	material				
Stone Screening	a) Quality / Grading	Field/ Lab	Rd. 41 & MORTH 404.2.6 Table No. 400-8	As remarks and below Table .	1test per 25m <sup>3</sup> of screening material.	P	W/R	A	Quality: Should be free from organic deleterious matter. Should be tough & dense.
			Table 400 -8						
			Grading Classification	Size of screening	IS Sieve designation	% by wt. passing the IS Sieve.			
			B	11.2 mm	11.2 mm	100			
					5.6 mm	90 - 100			
					180 micron	15 - 35			
Note : All material sampling for Lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.									





## ACTIVITY - Water Bound Macadam

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**Quality Assurance plan For Road Construction Works FOR PCMC, Pune**

**ACTIVITY - Water Bound Macadam**

Sr. No.	Item	Test performed	Method of test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
							CON	TPIA	PCMC	
1)	Material	*	*	*	*	*	*	*	*	*Covered under Material QAP
2)	<b>Surface Preparation</b>	Camber	Field	MORTH 404.3.1	2.5 to 5%	Random	P	W	A	Under mentioed notes are to be adhered to. #
<p># The Surface of the Subgrade/Subbase/Base to receive the WBM course shall be prepared to the specified lines and crossfall(camber) &amp; made free of dust &amp; other extraneous material.Any soft yielding places shall be corrected in an approved manner &amp; rolled untill firm surface is obtained if necessary by sprinkling water.Any subbase/base/surface irregularities, where predominant, shall be made good by providing appropriate, type of profile corrective course(levelling course) to clause 501 of these Specifications. It is desirable to completely pick out the existing thin bituminous wearing course where WBM is proposed to be laid over it.</p>										
3)	<b>Spreading</b>	Methodology check	Field	PWD Red hand book Clause No. RD. 29	##	Random	P	W	A	Under mentioed notes are to be adhered to. ##
<p>## The metal shall be screened if it contains grass, rubbish or other deleterious foreign material.The Metal shall be spread over the rolled rubble</p>										

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**Quality Assurance plan For Road Construction Works FOR PCMC, Pune**

**ACTIVITY - Water Bound Macadam**

Sr. No.	Item	Test performed	Method of test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
							CON	TPIA	PCMC	
<p>soling surface by giving a twisting motion to the basket at the time of spreading. The unevenness &amp; undulations after the spreading shall be rectified either by thinning the metal or adding it as required. The metal so spread shall be checked by camber boards &amp; line for the camber &amp; grade at interval of every 10metres or so. The edge line stakes shall be ranged for a sufficiently long length to obtain straight &amp; uniform curves. The sides of metal shall be held by bunds of murum to prevent metal from spreading if side widths are not provided.</p>										
<p>Note:- An efficient technical personnel is to be maintained at site by the contractor.</p>										
4)	<b>Rolling , watering , Repairing irregularities</b>	Methodology check	Field	Rd.35,40 & MORTH 404.34	As per remark given below ###	Random	P	W	A	

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<b>Quality Assurance plan For Road Construction Works FOR PCMC, Pune</b>										
<b>ACTIVITY - Water Bound Macadam</b>										
Sr. No.	Item	Test performed	Method of test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
							CON	TPIA	PCMC	
<p>### The compaction shall be done with a 10 to 12 tonnes power roller. The rolling shall begin with the outside rear wheel of the roller covering equal parts of shoulder &amp; metal &amp; the roller shall be ran forward &amp; backward until the shoulder holds the metal firmly. The rolling shall then progress from edge to the center in strips parallel to the center line of the road. The rolling shall be done by lapping uniformly each preceding rear wheel track by one half width of the track &amp; shall continue until all the surface has been rolled by the rear wheels three or four time &amp; to refusal. Side bunds shall be raised to hold the material before starting rolling.</p> <p>During &amp; after rolling the sections &amp; grades shall be checked with camber board and straight edges &amp; any defect set right at the time of rolling. Rolling shall not normally be done in length less than 100 m.</p> <p>The layer of metal shall be rolled dry first with 10 to 12 tonne power roller to refusal i.e. till the metal is completely interlocked &amp; ceases to move under the roller &amp; no more compaction can be achieved.</p> <p>The rolled surface shall be watered freely &amp; rolled again.</p>										
<p>Note:- An efficient technical personnel is to be maintained at site by the contractor.</p>										
5)	Spreading / Rolling of screening / Blindage (soft murum)	Methodology check	Field	Rd.28,31,32, 36	As per Remark	Random	P	W	A	Under mentioed notes are to be adhered to. #####



**Quality Assurance plan For Road Construction Works FOR PCMC, Pune**

**ACTIVITY - Water Bound Macadam**

Sr. No.	Item	Test performed	Method of test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
							CON	TPIA	PCMC	
<p>#### Dry rolling shall be done while the screenings are being spread. The screenings shall be spread uniformly in successive thin layer. After the screenings have been applied, the surface shall be copiously sprinkled with water, swept and rolled.</p>										
6)	Final Surface	Camber	Field	As per tender document	2.5 to 5%	At every 30mtr. interval.	P	W	A	
Note:- An efficient technical personnel is to be maintained at site by the contractor.										

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# BITUMINOUS BOUND MACADAM MATERIAL QAP

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<b>BITUMINOUS BOUND MACADAM MATERIAL QAP</b>									
Item	Tests to be Performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
						CO N	TPI A	PCM C	
40 mm Hand Broken metal & 40mm & 12mm machine d crushed metal	a) Abrasion Value	Lab	Circular of PWD standard specification/ Rd.41.3.1	Light/Medium Traffic = Max. 25% Heavy Traffic = Max. 17%	1 test /200 m <sup>3</sup> or part thereof	-	R	A	Either Abrasion or Impact Test should be conducted
	b) Impact value		Circular of PWD standard specification	Light/Medium Traffic = Max. 25% Heavy Traffic = Max. 25%		-	R	A	
	c) Crushing value		Circular of PWD standard specification/ Rd.41.3.1	Light/Medium Traffic=Max. 23% Heavy Traffic=Max. 17%		-	R	A	
	d) Stripping value		MORTH	Min. retaned coating 95%		-	R	A	
	e) Water absorption		Rd.41.3.1	Not more than 1%		-	R	A	
	f) Grading		MORTH Table	Gradtion as per		1 test	-	R	



Quality Assurance Plan For Road Construction Works For PCMC, PUNE.										
BITUMINOUS BOUND MACADAM MATERIAL QAP										
Item	Tests to be Performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks	
						CO N	TPI A	PCM C		
			500-6 for Coarse Aggregate AND Key Aggregate	MORTH Table 500-6 for Coarse Aggregate AND Key Aggregate	/100 m <sup>3</sup> or part thereof					
Note : All material sampling for Lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.										
	Gradation as per MORTH Table 500-6 for Coarse Aggregate AND Key Aggregate									
40 mm Hand Broken metal & 40mm & 12mm machine d crushed metal	IS Sieve	Cumulative % by weight of total aggregate passing								
		For 50mm compacted thickness		For 75mm compacted thickness						
		Coarse Aggregate	Key Aggregate	Coarse Aggregate	Key Aggregate					
	63 mm	–	–	100	–					
	45 mm	100	–	58 - 82	–					
	26.5 mm	37 - 72	–	–	–					
	22.4 mm	–	100	5 - 27	100					
	13.2 mm	2 - 20	50 - 75	–	50 - 75					





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BITUMINOUS BOUND MACADAM MATERIAL QAP									
Item	Tests to be Performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
						CO N	TPI A	PCM C	
	11.2 mm	-	-	-	-				
	5.6 mm	-	5 - 20	-	5 - 25				
	2.8 mm	0 - 5	0 - 5	0 - 5	0 - 5				
	Aprox. Loose aggregate quantities (cum/m <sup>2</sup> )	0.06	0.015	0.09	0.018				
	Binder quantity( kg/m <sup>2</sup> )	As per Tender Document - Sch-B							
40 mm Hand Broken metal & 40mm & 12mm machine d crushed metal	g) Quality	Field	Rd.41.3.1	As per remark & further details in Red hand book	Random	P	W	A	Stone aggregate shall be clean, strong, tough, dense, durable, close grained & free from soft, decayed & weathered portions & from coating of dust, dirt or other



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BITUMINOUS BOUND MACADAM MATERIAL QAP									
Item	Tests to be Performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
						CO N	TPI A	PCM C	
									objectionable matter.
	h) Flakiness Index (For crushed metal only)	Lab	Circular of PWD standard specification	Not more than 15%	1 test /200 m <sup>3</sup> or part thereof	-	R	A	

Note : All material sampling for Lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.

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# ACTIVITY- 75MM THICK Bituminous Bound Macadam

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**Quality Assurance plan For Road Construction Works FOR PCMC, Pune**

**ACTIVITY- 75MM THICK Bituminous Bound Macadam**

Sr. No.	Item	Tests to be Performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
							CON	TPIA	PCMC	
1)	Quality of Bitumen, C.Agg., F Agg.	#	#	#	#	#	#	#	#	# As per Material QAP Tests for Bitumen to be used for Tack coat is also to be done as per Material QAP.
2)	Base preparation	Camber before spreading 40mm metal.	Field	As per Schedule C, PWD Item No.4	As per Schedule C, PWD	Random	P	W	A	Road shall be closed to traffic. Edge lines shall be marked. <b>Existing road surface to be picked brought to required camber (2.5% to 5%) by using template &amp; string.</b>
3)	Preparation of base for <b>TACK COAT</b> (if requirement is of Sch 'B')	Visual	Field	MORTH 503.4.2	##	Random	P	W	A	## Surface of layer on which tack coat to be applied should be dry. Surface should be made dust free by using Air compressor.

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**Quality Assurance plan For Road Construction Works FOR PCMC, Pune**

**ACTIVITY- 75MM THICK Bituminous Bound Macadam**

Sr.	Item	Tests to be	Metho	Reference		Frequency	Agency			
4)	Application of tack coat. (if requirement is of Sch 'B')	Rate of spread of bitumen	Field	Sch 'B' or Rd.47.3.3	5kg per 10 sqm.	One test per 500m <sup>2</sup>	P	R/W	A	Record to be maintained by contractor. Plates & weighing balance should be kept at site. Uniform application to be done. Retack-coating is to be done on wheel marks of the dumper. Bitumen spray set fitted on bitumen boiler is to be used. Only in areas that are inaccessible a pressure hand sprayer is to be used.
		Temperature of Tack coat	Field	PWD Hand Book 47.3.3	163 °C to 177 °C		P	R/W	A	
<p>Note:- An efficient technical personnel is to be maintained at site by the contractor.</p>										
5)	Spreading 40 mm size metal & Compaction	Methodology Check	Field	As per Schedule C of PWD & their item No.7.1	As per remark.	Random	P	W	A	First layer shall be of 40mm hand broken metal & compacted. Later 40mm crushed metal shall be spread & compacted. Required crossfall is to be

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**ACTIVITY- 75MM THICK Bituminous Bound Macadam**

Sr.	Item	Tests to be	Metho	Reference		Frequency	Agency			
										maintained.
6)	Bitumen spraying for grouting	Temperature while heating & applying.	Field	Rd.45.3.5	For S 35 / S65 =177 <sup>0</sup> c-191 <sup>0</sup> c	Random	P	W	A	Before spraying any irregularities to be made good. Bouzer to be weighed before and after the activity on an electronic weigh bridge and checked 100% by SGS.
		Rate of application	Field	Rd.45.3.1	For S 35 /S 65 =200kg/100m <sup>2</sup>					
7)	Spreading blinding chips (12mm)	Methodology Check	Field	As per Schedule C, PWD.	As per remark.	Random	P	W	A	Metal & chips shall be entirely dry at the time of application. Voids are to be completely filled by uniform spreading of chips & bitumen.
8)	Compaction	Relevant	Field	Rd.45.3.7 &	As per remark	Random	P	W	A	



**Quality Assurance plan For Road Construction Works FOR PCMC, Pune**

**ACTIVITY- 75MM THICK Bituminous Bound Macadam**

Sr.	Item (Final)	Tests to be check	Metho	Reference PWD Specification , Sch.'C'.	given below.	Frequency	Agency			
							P	W	A	
<p>## Inequalities observed during &amp; after compaction shall be made good by spreading the reserve aggregate in depressions &amp; removing aggregate from the high spots &amp; by compacting. Immediately after spraying of bitumen &amp; spreading of key aggregates. The surface shall be rolled with a vibratory power roller to obtain full compaction and to force the blindage of key aggregates into the interstices of the coarse aggregates. The rolling shall continue till the asphalt surface hardens and key aggregates stop moving under power roller.</p>										
9)	Final Finish	Camber	Field	As per tender document	2.5% to 5%	At every 30mtr interval	P	W	A	

Note:- An efficient technical personnel is to be maintained at site by the contractor.

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# GSB MATERIAL QAP

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<b>GSB MATERIAL QAP</b>																																																															
ITEM	TEST TO BE PERFORMED	METHO D OF TEST	REFERENCE CODE	PERMISSIBLE LIMIT	FREQUENC Y	AGENCY			REMARKS																																																						
						CO N	TPI A	PCM C																																																							
GRANULA R SUB BASE	Material	...	MORTH Section 400	MORTH clause 401.2.1 &401.2.2	...	...	...	...	#																																																						
	MIX DESIGN	Lab Test	As per MORTH- Table-400-1 / As per Tech. Spec.	As per MORTH- Table-400-1 /As per Tech. Spec./As per Tender requirement	1 TEST / SOURCE	P	R	A	##																																																						
	GRADATION	Lab / Field Test	As per MORTH- Table-400-1 / As per Tech. Spec.	As per MORTH- Table-400-1 given below	1 TEST / 200m <sup>3</sup>	P	W	A																																																							
<table border="1"> <thead> <tr> <th colspan="10">TABLE 400-1. GRADING FOR CLOSE GRADED GRANULAR SUB-BASE MATERIALS</th> </tr> <tr> <th rowspan="2">IS Sievr Designation</th> <th colspan="4">Percent by weight passing the IS sieve</th> <th rowspan="2"></th> <th rowspan="2"></th> <th rowspan="2"></th> <th rowspan="2"></th> <th rowspan="2"></th> </tr> <tr> <th>Grading - I</th> <th>Grading - II</th> <th>Grading - III</th> <th></th> </tr> </thead> <tbody> <tr> <td>75.00mm</td> <td>100</td> <td>....</td> <td>...</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>53.0mm</td> <td>80 - 100</td> <td>100</td> <td>...</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>26.5mm</td> <td>55 - 90</td> <td>70 - 100</td> <td>100</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>										TABLE 400-1. GRADING FOR CLOSE GRADED GRANULAR SUB-BASE MATERIALS										IS Sievr Designation	Percent by weight passing the IS sieve									Grading - I	Grading - II	Grading - III		75.00mm	100	....	...							53.0mm	80 - 100	100	...							26.5mm	55 - 90	70 - 100	100						
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ITEM	TEST TO BE PERFORMED		METHO D OF TEST	REFERENCE CODE	PERMISSIBLE LIMIT	FREQUENC Y	AGENCY			REMARKS
							CO N	TPI A	PCM C	
	9.50mm	35 - 65		50 - 80	65 - 95					
	4.75mm	25 - 55		40 - 65	50 - 80					
	2.36mm	20 - 40		30 - 50	40 - 65					
	0.425mm	10 - 25		15 - 25	20 - 35					
	0.075mm	3 - 10		3 - 10	3 - 10					
	CBR Value (Minimum) %	30		25	20					
	ATTERBERG LIMITS		Lab Test	IS : 2720 - PART 5	L.L = Not > 25% P.I = Not > 6%	1 TEST / 200m <sup>3</sup>	P	R	A	
	DENSITY OF COMPACTED LAYER		Field Test	IS : 2720 - PART 28	98 % of MDD	1 TEST / 500m <sup>2</sup>	P	W	A	
	MOISTURE CONTENT PRIOR TO COMPACTION		Field Test	IS : 2720 - PART 2	OMC +/- 1%	1 TEST / 250m <sup>3</sup>	P	W	A	
	C B R		Lab Test	IS : 2720 - PART 16	As per MORTH- Table-400-1 /As per Tech. Spec./As per Tender requirement	AS REQUIRED	P	R	A	
	DELETERIOUS		Lab Test	IS : 2720 - PART 27	NIL	AS	P	R	A	

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<b>Quality Assurance Plan For Road Construction Works For PCMC, PUNE</b>												
<b>GSB MATERIAL QAP</b>												
ITEM	TEST TO BE PERFORMED  CONSITUENTS	METHO D OF TEST	REFERENCE CODE	PERMISSIBLE LIMIT	FREQUENC Y  REQUIRED	AGENCY			REMARKS			
						CO N	TPI A	PCM C				
<p># -Material to be used for the work shall be natural sand,moorum gravel,crushed stone, or combination thereof depending upon the grading required. Material like crushed slag ,crushed concrete, brick, metal and kankar may be allowed only with specific approval of the Engineer . The material shall be free from organic or other deleterious constituents and conform to one of therr grading given in the table 400-1. The material shall have a 10 percent fines value of 50 KN or more ( for sample in soaked condition).If water absorption value of coarse aggregate is greater than 2 percent the soundness test (as per IS 2386 part 5) shall be carried out. It shall be insured perior to actual execution that the material to be used in the Sub Base satisfies the requirments of CBR and other physical requirments.</p>												
<p>## - Proportions / Blending to be done as per MORTH Table 400-11 . Mix Design shall be prepared and sumitted by contractor for review.</p>												
<p>Note :- All material samplins for Lab. Testing is to be offered by Contractor to SGS in consultation with PCMC Engineer for readiness.</p>												
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## **ACTIVITY - Granular Sub Base**

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<b>Quality Assurance Plan For Road Construction Works For PCMC, PUNE</b>									
<b>ACTIVITY - Granular Sub Base</b>									
ITEM	TEST TO BE PERFORMED	METHO D OF TEST	REFERENCE CODE	PERMISSIBLE LIMIT	FREQUENCY	AGENCY			REMARKS
						CO N	TPI A	PCMC	
Material	...	...	MORTH Section 400	MORTH clause 401.2.1, 401.2.2	...	...	...	...	Covered under Material QAP
Surface Preparation	Camber/Field Dry Density	Field	MORTH clause 401.4.1	2.5 to 5 % / 98 % Min.	Random	P	W	A	#
# :- Immediately prior to the laying of GSB, the subgrade already finish to MORTH Clause 301 or 305 as applicable shall be prepared by removing all vegetation and other extraneous matter, lightly sprinkled with water if necessary and rolled with two passes of 80 - 100 KN smooth wheeled roller.									
Spreading	Methodology check	Field	MORTH clause 401.4.2	MORTH clause 401.4.2	Random	P	W	A	##

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ACTIVITY - Granular Sub Base										
ITEM	TEST TO BE PERFORMED	METHOD OF TEST	REFERENCE CODE	PERMISSIBLE LIMIT	FREQUENCY	AGENCY			REMARKS	
						CON	TPIA	PCMC		
<p>## :- The GSB Material of grading specified in the contract shall be spread on the prepared subgrade with the help of a motor grader of adequate capacity, its blade having hydraulic controls suitable for internal adjustment and for maintaining required slope and grade during the operation or other means as approved by the Engineer. When the sub-base material consists of combination of materials mentioned in Clause 401.2.1, mixing shall be done mechanically by the mix-in-place method. Manual mixing shall be permitted only where the width of laying is not adequate for mechanical operations, as in small-sized jobs. The equipment used for mix-in-place construction shall be a rotavator or similar approved equipment capable of mixing the material to the desired degree. If so desired by the Engineer, trial runs with the equipment shall be carried out to establish its suitability for the work. Moisture content of the loose material shall be checked in accordance with IS: 2720 (Part 2) and suitably adjusted by sprinkling additional water from a truck mounted or trailer mounted water tank and suitable for applying water uniformly and at controlled quantities to variable widths of surface or other means approved by the Engineer so that, at the time of compaction, it is from 1 per cent above to 2 per cent below the optimum moisture content corresponding to IS:2720 (Part 8). While adding water, due allowance shall be made for evaporation losses. After water has been added, the material shall be processed by mechanical or other approved means like disc harrows, rotavators until the layer is uniformly wet. (MORTH clause 401.4.2)</p>										
Rolling and Compaction	Methodology check	Field	MORTH clause 401.4.2	MORTH clause 401.4.2	Random	P	W	A	###	

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ACTIVITY - Granular Sub Base									
ITEM	TEST TO BE PERFORMED	METHOD OF TEST	REFERENCE CODE	PERMISSIBLE LIMIT	FREQUENCY	AGENCY			REMARKS
						CON	TPIA	PCMC	
<p>### - Immediately after spreading of GSB layer (as per MORTH clause 401.4.2) rolling shall start. If the thickness of the compacted layer does not exceed 100mm , a smooth wheeled roller of 80 to 100 kN weight may be used. For a compacted single layer upto 225 mm the compaction shall be done with the help of a vibratory roller of minimum 80 to 100 kN static weight with plain drum or pad foot-drum or heavy pneumatic tyred roller of minimum 200 to 300 kN weight having a minimum tyre pressure of 0.7 MN/m<sup>2</sup> or equivalent capacity roller capable of achieving the required compaction. Rolling shall commence at the lower edge and proceed towards the upper edge longitudinally for portions having unidirectional crossfall and super- elevation and shall commence at the edges and progress towards the centre for portions having crossfall on both sides. Each pass of the roller shall uniformly overlap not less than one-third of the track made in the preceding pass. During rolling, the grade and crossfall (camber) shall be checked and any high spots or de[ressions which become apparent, corrected by removing or adding fresh material. The speed of the roller shall not exceed 5 km per hour. Rolling shall be continued till the density achieved is at list 98% of the maximum dry density for the material determined as per IS 2720 (part 8). The surface of any layer of material on completion of compaction shall be closed, free from movement under equipment and from compaction planes, ridges, cracks or loose material. All loose, segregated or otherwise defective areas shall be made good to the full thickness of layer and re-compacted.</p>									
Final Surface	Camber	field	MORTH clause 401.5	2.5 to 5 % .	at every 30 mtr interval	P	W	A	#####
<p>#### :- The surface finish of construction shall conform to the requirement of MORTH Clause 902. Control on the quality of material shall be exercised in accordance with MORTH section 900.</p>									

Note :- An efficient technical personnel is to be maintained at site by the contractor.

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<b>ACTIVITY - Granular Sub Base</b>									
ITEM	TEST TO BE PERFORMED	METHO D OF TEST	REFERENCE CODE	PERMISSIBLE LIMIT	FREQUENCY	AGENCY			REMARKS
						CO N	TPI A	PCMC	

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# WMM MATERIAL QAP

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WMM MATERIAL QAP										
ITEM	TEST TO BE PERFORMED	METHOD OF TEST	REFERENCE CODE	PERMISSIBLE LIMIT	FREQUENCY	AGENCY			REMARKS	
						CON	TPIA	PCMC		
WET MIX MACADAM	MATERIAL	..	...	...	...	..	...	...	#	
	MIX DESIGN	Lab. Test	As per MORTH-Table-400-11/ As per Tech. Spec.	As per MORTH-Table-400-11/ As per Tech. Spec.	1 TEST / SOURCE	P	R	A	##	
	GRADATION ( COMBAINED & INDIVIDUAL )	Lab. /Field Test	As per MORTH-Table-400-11/ As per Tech. Spec.	As per MORTH-Table-400-11/ Table Given Below	1 TEST / 100m <sup>3</sup>	P	W	A		
	TABLE 400-11. GRADING REQUIRMENTS OF AGGREGATES FOR WET MIX MACADAM									
			IS Sievr Designation	Percent by weight passing the IS sieve						
			53.0mm	100						
			45.0mm	95 - 100						
		22.4mm	60 - 80							

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WMM MATERIAL QAP											
ITEM	TEST TO BE PERFORMED			METHOD OF TEST	REFERENCE CODE	PERMISSIBLE LIMIT	FREQUENCY	AGENCY			REMARKS
								CON	TPIA	PCMC	
			11.20mm		40 - 60						
			4.75mm		25 - 40						
			2.36mm		15 - 30						
			600mic.		08 - 22						
			75mic.		0 - 8						
	ATTERBERG LIMITS			Lab. Test	IS : 2720 - PART 5	L.L = Not > 25% P.I = Not > 6%	1 TEST / 100m <sup>3</sup>	P	R	A	
	AGGREGATE IMPACT VALUE / LOS ANGES ABRASION VALUE			Lab. Test	IS : 2386 - PART 4	Max.= 30%(AIV) Max.= 40% (LAA)	1 TEST / 200m <sup>3</sup>	P	R	A	
	FLAKINESS & ELONGATION INDEX			Lab. Test	IS : 2386 - PART 1	Max.= 30%(Comb)& Max.=15% each.	1 TEST / 200m <sup>3</sup>	P	R	A	
	DENSITY OF COMPACTED LAYER			Field Test	IS : 2720 - PART 28	98% of MDD	1 TEST / 500m <sup>2</sup>	P	W	A	



Quality Assurance Plan For Road Construction Works For PCMC, PUNE												
WMM MATERIAL QAP												
ITEM	TEST TO BE PERFORMED	METHOD OF TEST	REFERENCE CODE	PERMISSIBLE LIMIT	FREQUENCY	AGENCY			REMARKS			
						CON	TPIA	PCMC				
# - Coarse Aggregate shall be crushed stone. If crushed gravel/shingle is used, not less than 90% by weight of gravel/shingle pieces retained on 4.75 mm shall have at list two fractured faces. The aggregates shall conform to the physical requirement set forth in Table 400-10 . If the water absorption value of coarse aggregate is greater than 2%, the soundness test (as per IS 2386 part 5) shall be carried out.												
## - Proportions / Blending to be done as per MORTH Table 400-11 . Mix Design shall be prepared and submitted by contractor for review.												
Note :- All material samplings for Lab. Testing is to be offered by Contractor to SGS in consultation with PCMC Engineer for readiness.												
CON - Contractor										W- WITNESS		
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## ACTIVITY - WET MIX MACADAM

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ACTIVITY - WET MIX MACADAM									
ITEM	TEST TO BE PERFORMED	METHOD OF TEST	REFERENCE CODE	PERMISSIBLE LIMIT	FREQUENCY	AGENCY			REMARKS
						CON	TPIA	PCMC	
Material	...	...	MORTH Section 400	MORTH clause 406.2	...	...	...	...	Covered under Material QAP
Surface Preparation	Camber/Field Dry Density	Field	MORTH clause 406.3.1	2.5 to 5 % / 98 % Min.	Random	P	W	A	#
<p># The Surface of the Subgrade/Subbase/Base to receive the WMM course shall be prepared to the specified lines and crossfall (camber) &amp; made free of dust &amp; other extraneous material. Any soft yielding places shall be corrected in an approved manner &amp; rolled until firm surface is obtained if necessary by sprinkling water. Any subbase/base/surface irregularities, where predominant, shall be made good by providing appropriate, type of profile corrective course (levelling course) to clause 501 of these Specifications.</p> <p>As far as possible, laying Wet Mix Macadam course over an existing thick bituminous layer may be avoided since it will cause problems of internal drainage of the pavement at the interface of two courses. It is desirable to completely pick out the existing thin bituminous wearing courses where Wet Mix Macadam can be laid over the existing thin bituminous surface by cutting 50 mm x 50 mm furrows at an angle of 45 degrees to the centre line of the pavement at one metre intervals in the existing road. The directions and depth of furrows shall be such that they provide adequate bondage and also serve to drain water to the existing granular base course beneath the existing thin bituminous surface.</p>									
Mix Preparation	Methodology check	Field	MORTH clause 406.3.3	MORTH clause 406.3.3	Random	P	W	A	##

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ITEM	TEST TO BE PERFORMED	METHOD OF TEST	REFERENC E CODE	PERMISSIBLE LIMIT	FREQUENC Y	AGENCY			REMARKS
						CON	TPIA	PCM C	
<p>##- Wet Mix Macadam shall be prepared in an approved mixing plant of suitable capacity having provision for controlled addition of water and forced / positive mixing arrangement like pugmill or pan type mixer of concrete batching plant. For small quantity of wet mix work, the Engineer may permit the mixing to be done in concrete mixes. Optimum moisture for mixing shall be determined in accordance with IS:2720 (Part-8) after replacing the aggregate fraction retained on 22.4 mm sieve with material of 4.75 mm to 22.4 mm size. While adding water, due allowance should be made for evaporation losses. However, at the time of compaction, water in the wet mix should not vary from the optimum value by more than agreed limits. The mixed material should be uniformly wet and no segregation should be permitted.</p>									
<p>Note :- An efficient technical personnel is to be maintained at site by the contractor.</p>									
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Spreading	Methodology check	Field	MORTH clause 406.3.4	MORTH clause 406.3.4	Random	P	W	A	###

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ACTIVITY - WET MIX MACADAM									
ITEM	TEST TO BE PERFORMED	METHOD OF TEST	REFERENCE CODE	PERMISSIBLE LIMIT	FREQUENCY	AGENCY			REMARKS
						CON	TPIA	PCMC	
<p>### - Immediately after mixing, the mix shall be spread uniformly and evenly upon the prepared subgrade/sub-base/base in, requirement quantities, In no case should these be dumped in heaps directly on the area where these are to be laid nor shall their hauling over a party completed stretch be permitted. The mix may be spread either by a paver finisher or motor grader. For portions where mechanical means cannot be used, manual means as approved by the Engineer shall be used. The motor grader shall be capable of spreading the material uniformly all over the surface. Its blade shall have hydraulic control suitable for initial adjustments and maintaining the same so as to achieve the specified slope and grade. The surface of the aggregate shall be carefully checked with templates and all high or low spots remedied by removing or adding aggregate as may be required. The layer may be tested by depth blocks during construction. No segregation of larger and fine particles should be allowed. The aggregates as spread should be of uniform gradation with no pockets of fine materials.</p>									
Compaction and repairing irregularities	Methodology check	Field	MORTH Clause 406.3.5 & 406.6	MORTH Clause 406.3.5 & 406.6	Random	P	W	A	####





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ACTIVITY - WET MIX MACADAM									
ITEM	TEST TO BE PERFORMED	METHOD OF TEST	REFERENC E CODE	PERMISSIBLE LIMIT	FREQUENC Y	AGENCY			REMARKS
						CON	TPIA	PCM C	
<p>#### - After the mix has been laid to the required thickness, grade and crossfall/camber the same shall be uniformly compacted, to the full depth with suitable roller. If the thickness of single compacted, layer does not exceed 100mm, a smooth wheel roller of 80 to 100kN weight may be used. For a compacted single layer upto 200 mm, the compaction shall be done with the help of vibratory roler of minimum static weight of 80 to 100 kN or equivalent capacity roller. The speed of the roller shall not exceed 5 km/h. In portions having unidirectional cross fall / superelevation, rolling shall commence from the lower edge and progress gradually towards the upper edge. Thereafter, roller should progress parallel to the centre line of the road, uniformly over-lapping each preceding track by at least one third width unil the entire surface has been rolled. Alternate trips of the roller shall be terminated in stops at least 1 m away from any preceding stop. Any displacement occurring as a result of reversing of the direction of a roller or from any other cause shall be corrected at once as specified and/or removed and made good. Rolling shall be continued till the density achieved is at least 98 per cent of the maximum dry density achieved is at least 98 per cent of the maximum dry density for the material as determined by the method outlined in IS:2720 (Part-8). Where the surface irregularity of the wet mix macadam course exceeds the permissible tolerances or where the course is otherwise defective due to subgrade soil getting mixed with the aggregates, the full thickness of the layer shall be scraified over the affected area, reshaped with added premixed material or removed and replaced with fresh premixed material as applicable and recompacted in accordance with Clause 406.3. The area treated in the aforesaid manner shall not be less than 5 m long and 2 m wide. In no case shall depressions be filled up with unmixed and ungraded material or fines.</p>									
Final Surface	Camber	field	MORTH clause 406.5.1	2.5 to 5 %	at every 30 mtr interval	P	W	A	#####
##### - The surface finish of construction shall conform to the requirements of Clause 902.									



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ACTIVITY - WET MIX MACADAM									
ITEM	TEST TO BE PERFORMED	METHOD OF TEST	REFERENC E CODE	PERMISSIBLE LIMIT	FREQUENC Y	AGENCY			REMARKS
						CON	TPIA	PCM C	
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**MATERIAL QAP :**  
**LBM, BM, DBM, SDBC, BC, OGPS, MSS and PSC**

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<b>MATERIAL QAP : LBM, BM, DBM, SDBC, BC, OGPS, MSS and PSC</b>										
SR NO	ITEM	TESTS TO BE PERFORMED	METHOD OF TEST	REFERENCE DOC.	PERMISSIBLE LIMIT	FREQUENCY	AGENCY			REMARKS
							CON	TPIA	PCM C	
1	Bitumen VG 30	1) Absolute viscosity at 60°C, Poises.	Lab	IS: 73	Min. 2400	As per Table 2 of IS 73:2006 shown below.	-	R	A	Clean containers with proper lid arrangement to be kept for sampling of bitumen for lab testing by contractor.  For TACK COAT bituminous emulsion complying with IS: 8887 of a type & grade as specified in the contract or as directed by the Engineer.
		2) Kinematic viscosity at 135°C	Lab		Min. 350					
		3) Flash point - cleveand open cup, °C	Lab		Min. 220					
		4) Solubility in trichloroethylene, %	Lab		Min. 99					
		5) Penetration at 25°C, 100g, 5 sec, 0.1mm	Lab		50-70					



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**MATERIAL QAP : LBM, BM, DBM, SDBC, BC, OGPS, MSS and PSC**

SR NO	ITEM	TESTS TO BE PERFORMED	METHOD OF TEST	REFERENCE DOC.	PERMISSIBLE LIMIT	FREQUENCY	AGENCY			REMARKS
							CON	TPIA	PCM	
		6) Softening point (R&B), °C	Lab		Min. 47					The paving bitumen binder shall be homogenous and shall not foam when to 175°C.
		7) Tests on residue from thin film oven test/ RFTFOT								In any consignment, all the containers of paving grade <b>bitumen binders of same category &amp; grade from the same batch of manufacture</b> shall be grouped to constitute a lot and containers selected as per Table 2.
		a) Viscosity ratio at 60°C	Lab		4.0					
		b) Ductility at 25°C, cm, after TFOT	Lab		40					
Note : All material sampling for										

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MATERIAL QAP : LBM, BM, DBM, SDBC, BC, OGPS, MSS and PSC										
SR NO	ITEM	TESTS TO BE PERFORMED	METHOD OF TEST	REFERENCE DOC.	PERMISSIBLE LIMIT	FREQUENCY	AGENCY			REMARKS
							CON	TPIA	PCM	
	Lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.									
	<b>Scale of sampling as per Table 2 (IS 73: 2006)</b>					Sampling apparatus				
	Sr. No.	Lot size	No. of Containers to be selected.			1) A metal vessel having a handle which shall not be adversely affected by hot bitumen. (capacity - half lit.)				
	1	Up to 50	3			2) Sampling thief or tube of either glass or metal, to reach to within 3mm of the bottom of the vessel. (capacity- half or 1 lit.)				
	2	51-150	5			3) Ship augur of such dia. & length as to permit a core of convenient size to be taken throughout the depth of the package or cake.				
	3	151-500	7			4) Sampling scoop, Knife or spatula, Hammer, chisel and Bottle sampler are to be kept at site / plant.				
	4	501 and above	10							



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SR NO	ITEM	TESTS TO BE PERFORMED	METHOD OF TEST	REFERENCE DOC.	PERMISSIBLE LIMIT	FREQUENCY	AGENCY			REMARKS
							CON	TPIA	PCMC	
2	Coarse Agg.	1) Cleanliness (dust) / Grain size analysis	Lab	MORTH	LBM,BM, DBM, SDBC, BC, OGPS, MSS =Max. 5% passing 0.075mm sieve	LBM,BM, DBM, SDBC, BC: 2 tests per day plant.	-	R	A	Sizes = 40mm, 25mm,20mm, 10 mm & 6mm.(Coarse aggregate retained on 2.36mm sieve)
					*** OGPS ***PSC	1 test per 25 m3 of aggregate	-	R	A	***OGPS 13.2mm=Passing 22.4mm sieve & retained on 11.2mm sieve) 11.2mm= Passing 13.2mm sieve (Max. 5% passing 0.075mm sieve.) *** PSC Passing 11.2mm sieve & max. 95% passing 75 micron sieve.

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SR NO	ITEM	TESTS TO BE PERFORMED	METHOD OF TEST	REFERENCE DOC.	PERMISSIBLE LIMIT	FREQUENCY	AGENCY			REMARKS
							CON	TPIA	PCM	
		2) F.I & E.I (combined)	Lab	MORTH	****	1 test per 50 m3 of aggregate	-	R	A	**** LBM,BM, DBM, SDBC, BC, OGPS, CGPS/MSS, PSC (Type A) =Max. 30%
Note : All material sampling for Lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.										
2. Continue	Coarse Agg.	3) L.A value **	Lab	MORTH	LBM,BM, OGPS, CGPS/ MSS, PSC (Type A) =Max. 40%	1 test per 50 m3 of aggregate	-	R	A	** Agg. may satisfy requirements of either of these two tests.
					DBM, BC =Max. 30%					
		4) Impact value **	Lab	MORTH	LBM,BM, OGPS, CGPS/ MSS, PSC (Type A) =Max. 30%	1 test per 50 m3 of aggregate	-	R	A	

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MATERIAL QAP : LBM, BM, DBM, SDBC, BC, OGPS, MSS and PSC										
SR NO	ITEM	TESTS TO BE PERFORMED	METHOD OF TEST	REFERENCE DOC.	PERMISSIBLE LIMIT	FREQUENCY	AGENCY			REMARKS
							CON	TPIA	PCM	
					DBM, SDBC =Max. 27%					
					BC =Max. 24%					
		5) Soundness-	Lab	MORTH	LBM,BM, DBM, SDBC, BC, OGPS, CGPS/ MSS, PSC (Type A) =	##	-	R	A	## Initially, one determination by each method for each source of supply, then as warranted by change in the quality of aggregates.
		a) Sodium sulphate			Max. 12%					
		b) Magnesium sulphate			Max. 18%					
Note : All material sampling for Lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.										
2. Continue	Coarse Agg.	6) Water absorption	Lab	MORTH	LBM,BM, DBM, SDBC, BC =Max. 2%	#	-	R	A	# Initially one set of 3 representative specimens for each source of supply.



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SR NO	ITEM	TESTS TO BE PERFORMED	METHOD OF TEST	REFERENCE DOC.	PERMISSIBLE LIMIT	FREQUENCY	AGENCY			REMARKS
							CON	TPIA	PCM	
					OGPS, CGPS/MSS, PSC (Type A) =Max. 1%					Subsequently when warranted by changes in the quality of aggregates.
		7) Water sensitivity	Lab	MORTH	LBM,BM, DBM, SDBC, BC, OGPS, CGPS/MSS, PSC (Type A) =Min.80%	# (if required)	-	R	A	
		8) Coating & stripping of Bitumen Agg. Mixtures	Lab	MORTH	LBM,BM, DBM, SDBC, BC, OGPS, CGPS/MSS, PSC (Type A) =Min. retained coating 95%	#	-	R	A	
		9) Retained Tensile Strength (Water	Lab	AASHTO T283	Min. 80%	1 per source if required.	-	R	A	### The water sensitivity test is only required if the

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MATERIAL QAP : LBM, BM, DBM, SDBC, BC, OGPS, MSS and PSC										
SR NO	ITEM	TESTS TO BE PERFORMED	METHOD OF TEST	REFERENCE DOC.	PERMISSIBLE LIMIT	FREQUENCY	AGENCY			REMARKS
							CON	TPIA	PCM	
		sensitivity) ###								min. retained coating is less than 95%
Note : All material sampling for Lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.										
3	Fine Aggregate (Consisting of crushed or natural material / combination)	Sieve analysis	Lab	MORTH	*****	1 test per 25 m3 of aggregate	-	R	A	***** LBM, BM, DBM, SDBC, BC = Passing 2.36mm sieve & Max. 95% passing on 75 micron sieve. They shall be clean, hard, durable, dry & free from dust, and soft or friable matter, organic or other impurities.
		Plasticity Index	Lab	MORTH	DBM, SDBC, BC = Max. 4	1 test per 10 Lac work	-	R	A	For LBM, BM, OGPS, MSS this test does not apply.



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SR NO	ITEM	TESTS TO BE PERFORMED	METHOD OF TEST	REFERENCE DOC.	PERMISSIBLE LIMIT	FREQUENCY	AGENCY			REMARKS
							CON	TPIA	PCMC	
4	Filler (Mineral)	1) Grading	Lab	MORTH	As per MORTH table 500-9 shown below	1 test per 50 m3 of aggregate	-	R	A	Where the aggregates fail to meet the requirements of the water sensitivity test in Table 500-14 then 2 % by total wt. of agg., of hydrated lime shall be added without additional cost.
			IS Sieve (mm)	Cumulative percent passing by wt. of total agg.						
			0.6	100						
			0.3	95-100						
			0.075	85-100						
		2) Plasticity Index	Lab	MORTH 507.2.4	DBM, SDBC, BC = Max. 4	1 test per 25 m3	-	R	A	P.I. of fraction passing the 0.425 mm sieve free from organic impurities.
										For LBM, BM, OGPS, MSS Plasticity Index test does not apply.
								P.I. requirement shall not apply if		

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MATERIAL QAP : LBM, BM, DBM, SDBC, BC, OGPS, MSS and PSC										
SR NO	ITEM	TESTS TO BE PERFORMED	METHOD OF TEST	REFERENCE DOC.	PERMISSIBLE LIMIT	FREQUENCY	AGENCY			REMARKS
							CON	TPIA	PCMC	
										filler is cement or lime.
Note : All material sampling for Lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.										
5	Recipe Mix of BM = Agg. grading, binder content	Composition of BM/LBM material	Lab	MORTH 504	As shown in MORTH tables below	Each source or if there is change of source.	-	R	A	Proportions / blending to be done as per MORTH Tables 500-4. Recipe Mix shall be submitted by contractor and followed. Permissible limits shall be as per MORTH Table 500-13
		MORTH TABLE 500-4 ( For BM/LBM)								
		<i>Grading</i>		<i>Grading 1</i>	<i>Grading 2</i>					
		<i>Nominal agg. size</i>		<i>40 mm</i>	<i>19 mm</i>					
		<i>Layer thickness</i>		<i>80 - 100 mm</i>	<i>50 - 75 mm</i>					
		<i>IS sieve ** (mm)</i>	<i>Cum. % by wt. of total agg. passing</i>							
		45		100	-					
		37.5		90-100	-					



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**MATERIAL QAP : LBM, BM, DBM, SDBC, BC, OGPS, MSS and PSC**

SR NO	ITEM	TESTS TO BE PERFORMED	METHOD OF TEST	REFERENCE DOC.	PERMISSIBLE LIMIT	FREQUENCY	AGENCY			REMARKS
							CON	TPIA	PCMC	
		26.5		75-100	100					
		19		-	90-100					
		13.2		35-61	56-88					
		4.75		13-22	16-36					
		2.36		4-19	4-19					
		0.3		2-10	2-10					
		0.075		0-8	0-8					
		Bitumen content, % by mass of total mix#		3.1-3.4	3.3-3.5					
		Bitumen grade (pen)		As per Sch. B						
		Avg. Compacted density	Min.2.2							
Note : All material sampling for Lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.										
6	Mixture design = Agg. grading, binder content &	Composition of DBM material	Lab	MORTH 507	As shown in MORTH tables below	Each source. If any change in source of material is	-	R	A	Proportions / blending to be done as per MORTH Tables 500-10 & 500-11(DBM)

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**MATERIAL QAP : LBM, BM, DBM, SDBC, BC, OGPS, MSS and PSC**

SR NO	ITEM	TESTS TO BE PERFORMED	METHOD OF TEST	REFERENCE DOC.	PERMISSIBLE LIMIT	FREQUENCY	AGENCY			REMARKS
							CON	TPIA	PCM	
	JOB MIX FORMULA (JMF ##)	MORTH TABLE 500-10 ( For DBM)				proposed; a new job mix formula should be established before actually using the material.				Mix design shall be submitted by Contractor.
		Grading		Grading 1	Grading 2					
		Nominal agg. size		40 mm	25 mm					
		Layer thickness		80 - 100 mm	50 - 75 mm					
		IS sieve ** (mm)	Cum. % by wt.of total agg. passing							
		45		100	-					
		37.5		95-100	100					
		26.5		63-93	90-100					
		19		-	71-95					
		13.2		55-75	56-80					
		9.5		-	-					
		4.75		38-54	38-54					
		2.36		28-42	28-42					
		1.18		-	-					
		0.6		-	-					
	0.3		7-21	7-21						
									# Determined by Marshall method ** The combined agg. grading shall not vary from the low limit on one sieve to the high limit on the adjacent sieve. ## The procedure for formulating the JMF shall be generally as specified in	

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SR NO	ITEM	TESTS TO BE PERFORMED	METHOD OF TEST	REFERENCE DOC.	PERMISSIBLE LIMIT	FREQUENCY	AGENCY			REMARKS
							CON	TPIA	PCM	
		0.15		-	-					MORTH 507.3.3 & the results of tests enumerated in MORTH Table 500-11 as obtained by the contractor.  Note: JMF to be done from SGS Lab.
		0.075		2-8	2-8					
		Bitumen content, % by mass of total mix#		Min. 4.0	Min. 4.5					
		Bitumen grade (pen)	As per Sch.B							
		Avg. Compacted density #	Min.2.3							

Note : All material sampling for Lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.

MORTH TABLE 500-11(For DBM)			MORTH TABLE 500-12 (For DBM)		
Min. stability (KN at 60°C)	9	Nominal Max. particle size(mm)**	Min. VMA. percent related to Design air voids, percent ##	** The nominal max. particle size is one size larger than the first sieve to retain more than 10%.	
Min. flow (mm)	2				
Max. flow (mm)	4				

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MATERIAL QAP : LBM, BM, DBM, SDBC, BC, OGPS, MSS and PSC												
SR NO	ITEM	TESTS TO BE PERFORMED	METHO D OF TEST	REFERENC E DOC.	PERMISSIBL E LIMIT	FREQUENC Y	AGENCY			REMARKS		
							CO N	TPI A	PCM C			
	Compaction level (No. of blows)		75 blows on each of the two faces of the specimen		9.5		3	4	5	## Interpolate min. voids in the mineral agg. (VMA) for design air voids value between those listed.		
							14	15	16			
							12.5	13	14		15	
	% air voids		3 to 6		19.0		12	13	14			
	% voids in mineral agg.(VMA)		As per MORTH Table 500-12		25.0		11	12	13	Permissible variations from the JMF shall be as per MORTH Table 500-13		
	% voids filled with bitumen (VFB)		65-75		37.5		10	11	12			
Note : All material sampling for Lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.												
7	Mixture design = Agg. grading, binder content & JOB MIX FORMULA (JMF ##)	Composition of SDBC material	Lab	MORTH 508	As shown in MORTH tables below	Each source. If any change in source of material is proposed; a new job mix formula	-	R	A	Proportions / blending to be done as per MORTH Tables 500-15 & 500-16(SDBC)		
										MORTH TABLE 500-15 (FOR SDBC)	Mix design shall be submitted by Contractor.	
										Grading	Grading 1	Grading 2
										Nominal agg.	13 mm	10 mm



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SR NO	ITEM	TESTS TO BE PERFORMED	METHOD OF TEST	REFERENCE DOC.	PERMISSIBLE LIMIT	FREQUENCY	AGENCY			REMARKS
							CON	TPIA	PCM	
		<i>size</i>				should be established before actually using the material.				# Determined by Marshall method ** The combined agg. grading shall not vary from the low limit on one sieve to the high limit on the adjacent sieve. ## The procedure for formulating the JMF shall be generally as specified in MORTH 507.3.3 & the results of tests enumerated in MORTH Table 500-16 as obtained by
		<i>Layer thickness</i>		35-40 mm	25-30 mm					
		<i>IS sieve ** (mm)</i>	<i>Cum. % by wt.of total agg. passing</i>							
		45								
		37.5								
		26.5								
		19		100						
		13.2		90-100	100					
		9.5		70-90	90-100					
		4.75		35-51	35-51					
		2.36		24-39	24-39					
		1.18		15-30	15-30					
		0.6		-	-					
		0.3		9-19	9-19					
		0.15		-	-					

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**Quality Assurance Plan For Road Construction Works For PCMC, Pimpri, Pune.**

**MATERIAL QAP : LBM, BM, DBM, SDBC, BC, OGPS, MSS and PSC**

SR NO	ITEM	TESTS TO BE PERFORMED	METHO D OF TEST	REFERENC E DOC.	PERMISSIBL E LIMIT	FREQUENC Y	AGENCY			REMARKS
							CO N	TPI A	PCM C	
										the contractor.
		0.075		3-8	3-8					
		Bitumen content, % by mass of total mix#		Min. 4.5	min.5.0					Note: JMF to be done from SGS Lab.
		Bitumen grade (pen)	As per Sch.B							
		Avg. Compacted density#	Min. 2.25							

Note : All material sampling for Lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.

	MORTH TABLE 500-16 (For SDBC)		MORTH TABLE 500-12 (For SDBC)				
	Min. stability (KN at 60°C)	8.2	Nominal Max. particle size(mm)**	Min. VMA. percent related to Design air voids, percent ##			
	Min. flow (mm)	2					
	Max. flow (mm)	4					
	Compaction level (No. of blows)	75 blows on each of the two faces of the specimen		3	4	5	
			9.5	14	15	16	
			12.5	13	14	15	
	% air voids	3 to 6	19.0	12	13	14	** The nominal max. particle size is one size larger than the first sieve to retain more than 10%. ## Interpolate min. voids in the mineral agg. (VMA)

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Quality Assurance Plan For Road Construction Works For PCMC, Pimpri, Pune.										
MATERIAL QAP : LBM, BM, DBM, SDBC, BC, OGPS, MSS and PSC										
SR NO	ITEM	TESTS TO BE PERFORMED	METHOD OF TEST	REFERENCE DOC.	PERMISSIBLE LIMIT	FREQUENCY	AGENCY			REMARKS
							CON	TPIA	PCM	
										for design air voids value between those listed.
	% voids in mineral agg.(VMA)		As per MORTH Table 500-12		25.0		11	12	13	Permissible variations from the JMF shall be as per MORTH Table 500-13
	% voids filled with bitumen (VFB)		65-78		37.5		10	11	12	
Note : All material sampling for Lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.										
8	Mixture design = Agg. grading, binder content & JOB MIX FORMULA (JMF ##)	Composition of BC material	Lab	MORTH 509	MORTH tables 500-18	Each source. If any change in source of material is proposed; a new job mix formula should be established before actually	-	R	A	Proportions / blending to be done as per MORTH Tables 500-18& 500-19(BC)
		MORTH TABLE 500-18 (FOR BC)								
		Grading		Grading 1	Grading 2					
		Nominal agg. size		19 mm	13 mm					
		Layer thickness		50-65 mm	30-45 mm					
		IS sieve ** (mm)	Cum. % by wt.of total agg. passing							
		45								
		37.5								
26.5		100		Mix design shall be submitted by Contractor.						



**Quality Assurance Plan For Road Construction Works For PCMC, Pimpri, Pune.**

**MATERIAL QAP : LBM, BM, DBM, SDBC, BC, OGPS, MSS and PSC**

SR NO	ITEM	TESTS TO BE PERFORMED	METHO D OF TEST	REFERENC E DOC.	PERMISSIBL E LIMIT	FREQUENC Y	AGENCY			REMARKS
							CO N	TPI A	PCM C	
		19		79-100	100	using the material.				# Determined by Marshall method
		13.2		59-79	79-100		** The combined			
		9.5		52-72	70-88		agg. grading shall not vary from the low limit on one sieve to the high limit on the adjacent sieve.			
		4.75		35-55	53-71					
		2.36		28-44	42-58					
		1.18		20-34	34-48		## The procedure for formulating the JMF shall be generally as specified in MORTH 507.3.3 & the results of tests enumerated in MORTH Table 500-19 as obtained by the contractor.			
		0.6		15-27	26-38					
		0.3		10-20	18-28					
		0.15		5-13	12-20					
		0.075		2-8	4-10					
		Bitumen content, % by mass of total mix#		5.0 - 6.0	5.0-7.0					
		Bitumen grade (pen)	As per Sch.B					Note: JMF to be done from SGS		

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**Quality Assurance Plan For Road Construction Works For PCMC, Pimpri, Pune.**

**MATERIAL QAP : LBM, BM, DBM, SDBC, BC, OGPS, MSS and PSC**

SR NO	ITEM	TESTS TO BE PERFORMED	METHOD OF TEST	REFERENCE DOC.	PERMISSIBLE LIMIT	FREQUENCY	AGENCY			REMARKS
		Avg. Compacted density#	Min. 2.4				CON	TPIA	PCMC	
										Lab.

Note : All material sampling for Lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.

	MORTH TABLE 500-19(FOR BC)		MORTH TABLE 500-12 (FOR BC)				
	Min. stability (KN at 60°C)	9	Nominal Max. particle size(mm)**	Min. VMA. percent related to Design air voids, percent ##	** The nominal max. particle size is one size larger than the first sieve to retain more than 10%.		
	Min. flow (mm)	2					
	Max. flow (mm)	4					
	Compaction level (No. of blows)	75 blows on each of the two faces of the specimen	9.5	3	4	5	## Interpolate min. voids in the mineral agg. (VMA) for design air voids value between those listed.
			12.5	14	15	16	
	% air voids	3 to 6	19.0	12	13	14	
	% voids in mineral agg.(VMA)	As per MORTH Table 500-12	25.0	11	12	13	<b>Note: Permissible variations from</b>

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<b>Quality Assurance Plan For Road Construction Works For PCMC, Pimpri, Pune.</b>										
<b>MATERIAL QAP : LBM, BM, DBM, SDBC, BC, OGPS, MSS and PSC</b>										
SR NO	ITEM	TESTS TO BE PERFORMED	METHOD OF TEST	REFERENCE DOC.	PERMISSIBLE LIMIT	FREQUENCY	AGENCY			REMARKS
							CON	TPIA	PCM	
	% voids filled with bitumen (VFB)		65-75		37.5		10	11	12	the JMF shall be as per MORTH Table 500-13.
	Loss of Stability on immersion in water at 60°C (ASTM D 1075)		Min. 75% retained strength							
Note : All material sampling for Lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.										

<b>Quality Assurance Plan For Road Construction Works For PCMC, Pimpri, Pune.</b>										
<b>MATERIAL QAP : LBM, BM, DBM, SDBC, BC, OGPS, MSS and PSC</b>										
SR NO	ITEM	TESTS TO BE PERFORMED	METHOD OF TEST	REFERENCE DOC.	PERMISSIBLE LIMIT	FREQUENCY	AGENCY			REMARKS
							CON	TPIA	PCM	
1	Bitumen VG 30	1) Absolute viscosity at 60°C, Poises.	Lab	IS: 73	Min. 2400	As per Table 2 of IS 73:2006	-	R	A	Clean containers with proper lid arrangement to

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		2) Kinematic viscosity at 135°C	Lab		Min. 350	shown below.				be kept for sampling of bitumen for lab testing by contractor.
		3) Flash point - clevand open cup, °C	Lab		Min. 220					For TACK COAT bituminous emulsion complying with IS: 8887 of a type & grade as specified in the contract or as directed by the Engineer.
		4) Solubility in trichloroethylene, %	Lab		Min. 99					
		5) Penetration at 25°C, 100g, 5 sec, 0.1mm	Lab		50-70					
		6) Softening point (R&B), °C	Lab		Min. 47					The paving bitumen binder shall be homogenous and shall not foam when to 175°C.
		7) Tests on residue from thin film oven test/ RFTFOT								In any consignment, all the containers of paving grade <b>bitumen binders of same category &amp; grade from the same batch of manufacture</b> shall
		a) Viscosity ratio at 60°C	Lab		4.0					
		b) Ductility at 25°C, cm, after TFOT	Lab		40					





										be grouped to constitute a lot and containers selected as per Table 2.
Note : All material sampling for Lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.										
	<b>Scale of sampling as per Table 2 (IS 73: 2006)</b>					Sampling apparatus				
	Sr. No.	Lot size	No. of Containers to be selected.			1) A metal vessel having a handle which shall not be adversely affected by hot bitumen. (capacity - half lit.)				
	1	Up to 50	3			2) Sampling thief or tube of either glass or metal, to reach to within 3mm of the bottom of the vessel. (capacity- half or 1 lit.)				
	2	51-150	5			3) Ship augur of such dia. & length as to permit a core of convenient size to be taken throughout the depth of the package or cake.				
	3	151-500	7			4) Sampling scoop, Knife or spatula, Hammer, chisel and Bottle sampler are to be kept at site / plant.				
	4	501 and above	10							

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2	Coarse Agg.	1) Cleanliness (dust) / Grain size analysis	Lab	MORTH	LBM,BM, DBM, SDBC, BC, OGPS, MSS =Max. 5% passing 0.075mm sieve	LBM,BM, DBM, SDBC, BC: 2 tests per day plant.	-	R	A	Sizes = 40mm, 25mm,20mm, 10 mm & 6mm.(Coarse aggregate retained on 2.36mm sieve)
					*** OGPS ***PSC	1 test per 25 m3 of aggregate	-	R	A	***OGPS 13.2mm=Passing 22.4mm sieve & retained on 11.2mm sieve) 11.2mm= Passing 13.2mm sieve (Max. 5% passing 0.075mm sieve.) *** PSC Passing 11.2mm sieve & max. 95% passing 75 micron sieve.
	2) F.I & E.I (combined)	Lab	MORTH	****	1 test per 50 m3 of aggregate	-	R	A	**** LBM,BM, DBM, SDBC, BC, OGPS, CGPS/MSS, PSC (Type A) =Max. 30%	
Note : All material sampling for Lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.										



2. Continue	Coarse Agg.	3) L.A value **	Lab	MORTH	LBM,BM, OGPS, CGPS/ MSS, PSC (Type A) =Max. 40%	1 test per 50 m3 of aggregate	-	R	A	** Agg. may satisfy requirements of either of these two tests.
					DBM, BC =Max. 30%					
					SDBC =Max. 35%					
		4) Impact value **	Lab	MORTH	LBM,BM, OGPS, CGPS/ MSS, PSC (Type A) =Max. 30%	1 test per 50 m3 of aggregate	-	R	A	
					DBM, SDBC =Max. 27%					
					BC =Max. 24%					
		5) Soundness-	Lab	MORTH	LBM,BM, DBM, SDBC, BC, OGPS, CGPS/ MSS, PSC (Type A) =	##	-	R	A	## Initially, one determination by each method for each source of supply, then as warranted by change in the quality of aggregates.

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		a) Sodium sulphate			Max. 12%					
		b) Magnesium sulphate			Max. 18%					
Note : All material sampling for Lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.										
2. Continue	Coarse Agg.	6) Water absorption	Lab	MORTH	LBM,BM, DBM, SDBC, BC =Max. 2%	#	-	R	A	# Initially one set of 3 representative specimens for each source of supply. Subsequently when warranted by changes in the quality of aggregates.
					OGPS, CGPS/MSS, PSC (Type A) =Max. 1%					
		7) Water sensitivity	Lab	MORTH	LBM,BM, DBM, SDBC, BC, OGPS, CGPS/MSS, PSC (Type A) =Min.80%	# (if required)	-	R	A	
		8) Coating & stripping of Bitumen Agg. Mixtures	Lab	MORTH	LBM,BM, DBM, SDBC, BC, OGPS, CGPS/MSS, PSC (Type A) =Min. retained	#	-	R	A	



					coating 95%					
		9) Retained Tensile Strength (Water sensitivity) ###	Lab	AASHTO T283	Min. 80%	1 per source if required.	-	R	A	### The water sensitivity test is only required if the min. retained coating is less than 95%
Note : All material sampling for Lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.										
3	Fine Aggregate (Consisting of crushed or natural material / combination)	Sieve analysis	Lab	MORTH	*****	1 test per 25 m3 of aggregate	-	R	A	***** LBM, BM, DBM, SDBC, BC = Passing 2.36mm sieve & Max. 95% passing on 75 micron sieve. They shall be clean, hard, durable, dry & free from dust, and soft or friable matter, organic or other impurities.
		Plasticity Index	Lab	MORTH	DBM, SDBC, BC = Max. 4	1 test per 10 Lac work	-	R	A	For LBM, BM, OGPS, MSS this test does not apply.



4	Filler (Mineral)	1) Grading	Lab	MORTH	As per MORTH table 500-9 shown below	1 test per 50 m3 of aggregate	-	R	A	Where the aggregates fail to meet the requirements of the water sensitivity test in Table 500-14 then 2 % by total wt. of agg., of hydrated lime shall be added without additional cost.
			IS Sieve (mm)	Cumulative percent passing by wt. of total agg.						
			0.6	100						
			0.3	95-100						
			0.075	85-100						
		2) Plasticity Index	Lab	MORTH 507.2.4	DBM, SDBC, BC = Max. 4	1 test per 25 m3	-	R	A	P.I. of fraction passing the 0.425 mm sieve free from organic impurities.
										For LBM, BM, OGPS, MSS Plasticity Index test does not apply.
								P.I. requirement shall not apply if filler is cement or lime.		
Note : All material sampling for Lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.										

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5	Recipe Mix of BM = Agg. grading, binder content	Composition of BM/LBM material	Lab	MORTH 504	As shown in MORTH tables below	Each source or if there is change of source.	-	R	A	Proportions / blending to be done as per MORTH Tables 500-4. Recipe Mix shall be submitted by contractor and followed. Permissible limits shall be as per MORTH Table 500-13
		MORTH TABLE 500-4 ( For BM/LBM)								
		<i>Grading</i>		<i>Grading 1</i>	<i>Grading 2</i>					
		<i>Nominal agg. size</i>		<i>40 mm</i>	<i>19 mm</i>					
		<i>Layer thickness</i>		<i>80 - 100 mm</i>	<i>50 - 75 mm</i>					
		<i>IS sieve ** (mm)</i>		<i>Cum. % by wt. of total agg. passing</i>						
		45		100	-					
		37.5		90-100	-					
		26.5		75-100	100					
		19		-	90-100					
		13.2		35-61	56-88					
		4.75		13-22	16-36					
		2.36		4-19	4-19					

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		0.3		2-10	2-10						
		0.075		0-8	0-8						
		Bitumen content, % by mass of total mix#		3.1-3.4	3.3-3.5						
		Bitumen grade (pen)		As per Sch. B							
		Avg. Compacted density	Min.2.2								
Note : All material sampling for Lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.											
6	Mixture design = Agg. grading, binder content & JOB MIX FORMULA (JMF ##)	Composition of DBM material	Lab	MORTH 507	As shown in MORTH tables below	Each source. If any change in source of material is proposed; a new job mix formula should be established before actually using the material.	-	R	A	Proportions / blending to be done as per MORTH Tables 500-10 & 500-11(DBM)	
		MORTH TABLE 500-10 ( For DBM)									Mix design shall be submitted by Contractor.
		Grading		Grading 1	Grading 2						
		Nominal agg. size		40 mm	25 mm						
		Layer thickness		80 - 100 mm	50 - 75 mm						
		IS sieve ** (mm)	Cum. % by wt.of total agg. passing								
		45		100	-						
		37.5		95-100	100						
									# Determined by Marshall method		

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	26.5		63-93	90-100					** The combined agg. grading shall not vary from the low limit on one sieve to the high limit on the adjacent sieve.
	19		-	71-95					## The procedure for formulating the JMF shall be generally as specified in MORTH 507.3.3 & the results of tests enumerated in MORTH Table 500- 11 as obtained by the contractor.
	13.2		55-75	56-80					
	9.5		-	-					
	4.75		38-54	38-54					
	2.36		28-42	28-42					
	1.18		-	-					
	0.6		-	-					
	0.3		7-21	7-21					
	0.15		-	-					
	0.075		2-8	2-8					
	Bitumen content, % by mass of total mix#		Min. 4.0	Min. 4.5					Note: JMF to be done from SGS Lab.
	Bitumen grade (pen)	As per Sch.B							
	Avg. Compacted density #	Min.2.3							
Note : All material sampling for Lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.									
<b>MORTH TABLE 500-11(For DBM)</b>					<b>MORTH TABLE 500-12 (For DBM)</b>				

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	Min. stability (KN at 60°C)	9	Nominal Max. particle size(mm)**	Min. VMA. percent related to Design air voids, percent ##			** The nominal max. particle size is one size larger than the first sieve to retain more than 10%.
	Min. flow (mm)	2		3	4	5	
	Max. flow (mm)	4					
	Compaction level (No. of blows)	75 blows on each of the two faces of the specimen	9.5	14	15	16	## Interpolate min. voids in the mineral agg. (VMA) for design air voids value between those listed.
			12.5	13	14	15	
			% air voids	3 to 6	19.0	12	
	% voids in mineral agg.(VMA)	As per MORTH Table 500-12	25.0	11	12	13	Permissible variations from the JMF shall be as per MORTH Table 500-13
	% voids filled with bitumen (VFB)	65-75	37.5	10	11	12	

Note : All material sampling for Lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.

7	Mixture design = Agg. grading, binder content & JOB MIX FORMULA (JMF ##)	Composition of SDBC material	Lab	MORTH 508	As shown in MORTH tables below	Each source. If any change in source of material is proposed; a new job mix	-	R	A	Proportions / blending to be done as per MORTH Tables 500-15 & 500-16(SDBC) Mix design shall be submitted by Contractor.	
		MORTH TABLE 500-15 (FOR SDBC)									
		Grading		Grading 1	Grading 2						

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		<i>Nominal agg. size</i>		13 mm	10 mm	formula should be established before actually using the material.					
		<i>Layer thickness</i>		35-40 mm	25-30 mm						
		<i>IS sieve ** (mm)</i>	<i>Cum. % by wt.of total agg. passing</i>								# Determined by Marshall method
		45									** The combined agg. grading shall not vary from the low limit on one sieve to the high limit on the adjacent sieve.
		37.5									## The procedure for formulating the JMF shall be generally as specified in MORTH 507.3.3 & the results of tests enumerated in MORTH Table 500-16 as obtained by the contractor.
		26.5									
		19		100							
		13.2		90-100	100						
		9.5		70-90	90-100						
		4.75		35-51	35-51						
		2.36		24-39	24-39						
		1.18		15-30	15-30						
		0.6		-	-						
		0.3		9-19	9-19						
		0.15		-	-						
		0.075		3-8	3-8						
		Bitumen content, % by mass of total		Min. 4.5	min.5.0					Note: JMF to be done from SGS Lab.	



		mix#							
		Bitumen grade (pen)	As per Sch.B						
		Avg. Compacted density#	Min. 2.25						

Note : All material sampling for Lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.

MORTH TABLE 500-16 (For SDBC)			MORTH TABLE 500-12 (For SDBC)				
	Min. stability (KN at 60°C)	8.2	Nominal Max. particle size(mm)**	Min. VMA. percent related to Design air voids, percent ##			** The nominal max. particle size is one size larger than the first sieve to retain more than 10%.
	Min. flow (mm)	2					
	Max. flow (mm)	4					
	Compaction level (No. of blows)	75 blows on each of the two faces of the specimen		3	4	5	## Interpolate min. voids in the mineral agg. (VMA) for design air voids value between those listed.
			9.5	14	15	16	
			12.5	13	14	15	
	% air voids	3 to 6	19.0	12	13	14	Permissible variations from the JMF shall be as per MORTH Table 500-13
	% voids in mineral agg.(VMA)	As per MORTH Table 500-12	25.0	11	12	13	
	% voids filled with bitumen (VFB)	65-78	37.5	10	11	12	

Note : All material sampling for Lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.

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8	Mixture design = Agg. grading, binder content & JOB MIX FORMULA (JMF ##)	Composition of BC material	Lab	MORTH 509	MORTH tables 500-18	Each source. If any change in source of material is proposed; a new job mix formula should be established before actually using the material.	-	R	A	Proportions / blending to be done as per MORTH Tables 500-18& 500-19(BC)		
		MORTH TABLE 500-18 (FOR BC)										
		<i>Grading</i>		<i>Grading 1</i>	<i>Grading 2</i>							
		<i>Nominal agg. size</i>		<i>19 mm</i>	<i>13 mm</i>							
		<i>Layer thickness</i>		<i>50-65 mm</i>	<i>30-45 mm</i>							
		<i>IS sieve ** (mm)</i>	<i>Cum. % by wt. of total agg. passing</i>									
		45										
		37.5										
		26.5		100								
		19		79-100	100							
		13.2		59-79	79-100							
		9.5		52-72	70-88							
		4.75		35-55	53-71							
		2.36		28-44	42-58							
		1.18		20-34	34-48							
		0.6		15-27	26-38							
0.3		10-20	18-28									
0.15		5-13	12-20									
0.075		2-8	4-10									
									Mix design shall be submitted by Contractor.			
									# Determined by Marshall method			
									** The combined agg. grading shall not vary from the low limit on one sieve to the high limit on the adjacent sieve.			
									## The procedure for formulating the JMF shall be generally as specified in			



	Bitumen content, % by mass of total mix#		5.0 - 6.0	5.0-7.0					MORTH 507.3.3 & the results of tests enumerated in MORTH Table 500-19 as obtained by the contractor.
	Bitumen grade (pen)	As per Sch.B							Note: JMF to be done from SGS Lab.
	Avg. Compacted density#	Min. 2.4							
Note : All material sampling for Lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.									
	<b>MORTH TABLE 500-19(FOR BC)</b>			<b>MORTH TABLE 500-12 (FOR BC)</b>					
	Min. stability (KN at 60°C)	9		Nominal Max. particle size(mm)**	Min. VMA. percent related to Design air voids, percent ##			** The nominal max. particle size is one size larger than the first sieve to retain more than 10%.	
	Min. flow (mm)	2							
	Max. flow (mm)	4							
	Compaction level (No. of blows)	75 blows on each of the two faces of the specimen			3	4	5	## Interpolate min. voids in the mineral agg. (VMA) for design air voids value between those listed.	
				9.5	14	15	16		
				12.5	13	14	15		
	% air voids	3 to 6		19.0	12	13	14		
	% voids in mineral agg.(VMA)	As per MORTH Table 500-12		25.0	11	12	13	<b>Note: Permissible variations from</b>	

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	% voids filled with bitumen (VFB)	65-75	37.5	10	11	12	<b>the JMF shall be as per MORTH Table 500-13.</b>				
	Loss of Stability on immersion in water at 60°C (ASTM D 1075)	Min. 75% retained strength									
<b>Note : All material sampling for Lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.</b>											

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## ACTIVITY QAP :

# BITUMINOUS MACADAM / LEAN BITUMINOUS MACADAM

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<b>ACTIVITY QAP :BITUMINOUS MACADAM / LEAN BITUMINOUS MACADAM</b>										
SR. NO	ITEM	TESTS TO BE PERFORMED	METHOD OF TEST	REFERENCE DOC.	PERMISSIBLE LIMIT	EXTENT OF CHECK	AGENCY			REMARKS
							CON	TPIA	PCMC	
1	Review of make, grade & batch of bitumen	Visual	Field	Tender doc.	HP, BP, IOC Ltd. & 60/70	Each lot	P	R	A	Manufacturer's document submitted by contractor to PCMC along with invoices & challans for review.
2	Quality of Bitumen, C.Agg., F Agg.	#	#	#	#	#	#	#	#	# As per Material QAP Tests for Bitumen to be used for Tack coat is also to be done as per Material QAP or MORTH if required.

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SR. NO	ITEM	TESTS TO BE PERFORMED	METHOD OF TEST	REFERENCE DOC.	PERMISSIBLE LIMIT	EXTENT OF CHECK	AGENCY			REMARKS
							CON	TPIA	PCM	
3	Aggregate Grading.	Mix Grading	Lab/Field	MORTH	As per Morth table 500-4.	####	P	R/W	A	####Two tests per day per plant both on individual constituents & mixed aggregates from the dryer. SGS shall check the individual & mix grading at the beginning of work and randomly later. Record to be maintained by contractor. Proportioning of Material: The aggregates shall be proportioned & blended to produce a uniform mixture complying with the requirement of Table of 500-4.
4	Preparation of base for Tack coat	Visual	Field	MORTH 503.4.2	##	Random	P	W	A	## Surface of layer on which tack coat to be applied should be dry. Surface should be dust free by using Air compressor.
Note:- An efficient technical personnel is to be maintained at site by the contractor.										
5	Application of Tack coat	Rate of spread of bitumen	Field	Sch 'B', MORTH Table 900-4	5kg per 10 sqm.	One test per 500m <sup>2</sup> & not less than two tests per day.	P	R/W	A	SGS shall witness random tests & review other test results. Record to be maintained by contractor. Plates & weighing balance should be kept at site. Uniform



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							CON	TPIA	PCM	
		Temperature of Tack coat	Field	PWD Hand Book 47.3.3	163 °C to 177 °C					application to be done. Retack-coating is to be done on wheel marks of the dumper. Bitumen spray set fitted on bitumen boiler is to be used. Only in areas that are inaccessible a pressure hand sprayer is to be used.
6	Bitumen content & gradation of Bituminous Mix.	a) Grading	Field/ Plant Lab.	MORTH	As per Morth Table 500-4	Periodic, subject to minimum of two tests per day per plant	P	R/W	A	SGS shall witness random tests & review other test results.Record to be maintained by contractor.
		b) ** Binder content (%)								** Binder Content of LBM & BM shall be as per Recipe Mix report from Lab. Tolerances for Binder content and gradation shall be as per Table 500-13 of MORTH.
7	Temperature of hotmix material.	Temp. check	Field	* MORTH Table 500-5		At regular close interval or one test per day.	P	R/W	A	SGS shall witness random tests & review other test results.Record to be maintained by contractor.
		a) Bitumen Mixing			a) 150 to 165°C					
		b) Aggregate Mixing			b) 150 to 170°C					



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							CON	TPIA	PCM	
		c) Mixed Material.			c) Max. 165 °C					
		d) While Laying *			d) Min. 125 °C					
		e) Rolling *			e) Min. 90 °C					
Note:- An efficient technical personnel is to be maintained at site by the contractor.										
8	Rolling	Type of Roller	Field	MORTH 501.6	As per remarks	Random	P	W	A	Initial rolling by 8-10 Tonnes dead wt. smooth wheeled roller or vibratory roller. Intermediate rolling by 8-10 Tonnes dead wt. or vibratory roller or 12-15 Tonnes pneumatic roller. Final rolling by 6-8 Tonnes roller. No rolling marks should be visible and undulations/ uneven surfaces should be made good.
9	Density of compacted layer	Relative compacted density	Field	MORTH Manual 8.4.7.6	95% of lab density	One test per 250m <sup>2</sup> area	P	R/W	A	SGS shall witness random tests & review other test results. Record to be maintained by contractor.
10	Final	Camber	Field	MORTH	2.5% to	At 30 mtr.	P	W	A	



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SR. NO	ITEM	TESTS TO BE PERFORMED	METHOD OF TEST	REFERENCE DOC.	PERMISSIBLE LIMIT	EXTENT OF CHECK	AGENCY			REMARKS
							CON	TPIA	PCM	
	surface	Check		902.3	3%	longitudinally				
Note:- An efficient technical personnel is to be maintained at site by the contractor.										



## ACTIVITY QAP :DBM/SDBC/BC

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ACTIVITY QAP :DBM/SDBC/BC										
SR NO	ITEM	TESTS TO BE PERFORMED	METHOD OF TEST	REFERENCE DOC.	PERMISSIBLE LIMIT	EXTENT OF CHECK	AGENCY			REMARKS
							CON	TPIA	PCM	
1	Review of make & grade of bitumen	Visual	Field	Sch 'B'	HP, BP, IOC Ltd. & 60/70	Each lot	P	R	A	Manufacturer's document submitted by contractor to client along with invoices & challans for review.
2	Quality of Bitumen, C.Agg., F Agg.	#	#	#	#	#	#	#	#	# As per Material QAP Tests for Bitumen to be used for Tack coat is also to be done as per Material QAP or MORTH if required.
3	Job Mix	#	#	#	#	#	#	#	#	# As per Material QAP
The individual material needed for designing the mix shall be offered to SGS for drawing sample at the plant and designed at SGS lab. Once the laboratory job mix formula is approved, the Contractor shall carry out plant trials at the mixer to establish that the plant can be set up to produce a uniform mix confirming to the approved job mix formula. The permissible variations of the individual percentages of the various ingredients in the actual mix from the actual job mix formula to be used shall be within limits as specified in table 500-13.										
4	Preparation of base for tack coat.	Visual	Field	MORTH 503.4.2	##	Random	P	W	A	## Surface of layer on which tack coat to be applied should be dry. Surface should be dust free by using Air compressor.
Note:- An efficient technical personnel is to be maintained at site by the contractor.										



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ACTIVITY QAP :DBM/SDBC/BC										
SR NO	ITEM	TESTS TO BE PERFORMED	METHOD OF TEST	REFERENCE DOC.	PERMISSIBLE LIMIT	EXTENT OF CHECK	AGENCY			REMARKS
							CON	TPIA	PCM C	
5	Application of tack coat	Rate of spread of bitumen	Field	Sch 'B' , MORTH Table 900-4	5kg per 10 sqm.	One test per 500m <sup>2</sup> & not less than two tests per day.	P	R/W	A	SGS shall witness random tests & review other test results. Record to be maintained by contractor. Plates & weighing balance should be kept at site. Uniform application to be done. Retack-coating is to be done on wheel marks of the dumper. Bitumen spray set fitted on bitumen boiler is to be used. Only in areas that are inaccessible a pressure hand sprayer is to be used.
		Temperature of Tack coat	Field	PWD Hand Book 47.3.3	163 °C to 177 °C		P	R/W	A	
6	Bitumen Extraction & Gradation test of Bituminous Mix..	a) Grading	Field/ Plant Lab.	MORTH	a) As per MORTH Table 500-13 when compared with job/ recipe mix	One tests per for each 400 tones of mix subject to a minimum of two tests	P	R/W	A	SGS shall witness random tests & review other test results. Record to be maintained by contractor.
		b)** Binder content.								**Binder Content as per Job Mix Design.





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ACTIVITY QAP :DBM/SDBC/BC										
SR NO	ITEM	TESTS TO BE PERFORMED	METHOD OF TEST	REFERENCE DOC.	PERMISSIBLE LIMIT	EXTENT OF CHECK per day per plant	AGENCY			REMARKS
							CON	TPIA	PCMC	
Note:- An efficient technical personnel is to be maintained at site by the contractor.										
7	Marshall stability Test.	Stability at 60°C Flow Percent air voids Percent voids in mineral aggregate(VMA) Percent voids filled with bitumen(VFB)	Field/ Plant Lab.	MORTH	DBM/BC=9 KN & SDBC= 8.2KN 2-4 MM DBM/BC=3-6 % & SDBC= 3-5% As per Morth table 500-12 DBM/BC=65-75 % SDBC= 65-78%	***	P	R/W	A	***For each 400tonnes of mix product, a set of 3 Marshall specimens to be prepared & tested for stability, flow value, density and void content subject to a minimum of two sets being tested per palnt per day.SGS shall check the Marshall Stability Test at the beginning of work and randomly later. Record to be maintained by contractor.
8	Temperature of hotmix material.	Temp. check a) Bitumen Mixing	Field	* MORTH Table 500-5	a) 150 to 165°C	At regular close intervals or	P	R/W	A	SGS shall witness random tests & review other test results.Record to be



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SR NO	ITEM	TESTS TO BE PERFORMED	METHOD OF TEST	REFERENCE DOC.	PERMISSIBLE LIMIT	EXTENT OF CHECK	AGENCY			REMARKS
							CON	TPIA	PCMC	
		b) Agg. Mixing			b) 150 to 170°C	One test daily.				maintained by contractor.
		c) Mixed Material.			c) Max. 165 °C					
		d) While Laying *			d) Min. 125 °C					
		e) Rolling *			e) Min. 90 °C					
9	Rolling	Type of Roller	Field	MORTH 501.6	As per remarks	Random	P	W	A	Initial rolling by 8-10 Tonnes dead wt. smooth wheeled roller or vibratory roller. Intermediate rolling by 8-10 Tonnes dead wt. or vibratory roller or 12-15 Tonnes pneumatic roller. Final rolling by 6-8 Tonnes roller. No rolling marks should be visible and undulations/ uneven surfaces should be made good.
Note:- An efficient technical personnel is to be maintained at site by the contractor.										
10	Density of	Relative	Field	MORTH	95% of lab	One test per	P	R/W	A	SGS shall witness random



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SR NO	ITEM	TESTS TO BE PERFORMED	METHOD OF TEST	REFERENCE DOC.	PERMISSIBLE LIMIT	EXTENT OF CHECK	AGENCY			REMARKS
							CON	TPIA	PCM C	
	compacted layer	compacted density		Manual 8.4.7.6	density for base Course & 98% of lab density for wearing Course.	250m <sup>2</sup> area				tests & review other test results.Record to be maintained by contractor.
11	Final surface	Camber Check	Field	MORTH	2.5% to 3%	At 30 mtr. longitudinally	P	W	A	
	<b>MORTH Table 500-13</b>		<b>Permissible variations from the Job mix formula.</b>							
	<b>Description</b>				<b>Permissible variation</b>					
					<b>Base/binder course</b>		<b>Wearing course</b>			
	Agg. passing 19mm sieve or larger			± 8%			± 7%			
	Agg. passing 13.2mm, 9.5mm			± 7%			± 6%			
	Agg. passing 4.75mm			± 6%			± 5%			
	Agg. passing 2.36mm, 1.18mm, 0.6mm			± 5%			± 4%			
	Agg. passing 0.3mm, 0.15mm			± 4%			± 3%			
	Agg. passing 0.075mm			± 2%			± 1.5%			
	Binder content			± 0.3%			± 0.3%			
	Mixing temperature			± 10 °C			± 10 °C			
	<b>MORTH TABLE 500-12 (For DBM/SDBC/BC)</b>									
	Nominal Max. particle		Min. VMA. percent related to Design			** The nominal max. particle size				



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SR N O	ITEM	TESTS TO BE PERFORMED	METHO D OF TEST	REFERENC E DOC.	PERMISSIBLE LIMIT	EXTENT OF CHECK	AGENCY			REMARKS
							CO N	TPI A	PCM C	
	size(mm)**		air voids, percent ##			is one size larger than the first sieve to retain more than 10%.				
			3	4	5					
	9.5		14	15	16	## Interpolate min. voids in the mineral agg. (VMA) for design air voids value between those listed.				
	12.5		13	14	15					
	19.0		12	13	14					
	25.0		11	12	13					
	37.5		10	11	12					
Note:- An efficient technical personnel is to be maintained at site by the contractor.										

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# **ACTIVITY QAP : OPEN - GRADED PREMIX SURFACING**

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SR. NO	ITEM	TESTS TO BE PERFORMED	METHOD OF TEST	REFERENCE DOC.	PERMISSIBLE LIMIT	EXTENT OF CHECK	AGENCY			REMARKS
							CON	TPIA	PCM	
1	Review of make & grade of bitumen	Visual	Field	Sch 'B'	HP, BP, IOC Ltd. & 60/70	Each lot	P	R	A	Manufacturer's document submitted by contractor to client along with invoices & challans for review.
2	Quality of Bitumen, C.Agg., F Agg.	#	#	#	#	#	#	#	#	# As per Material QAP Tests for Bitumen to be used for Tack coat is also to be done as per Material QAP.
3	Aggregate Grading.(Raw material to be used for OGPS)	#	#	#	#	#	P	R	A	# Covered under material QAP.
4	Preparation of base	Visual	Field	MORTH	##	Random	P	W	A	## Surface of layer on which tack coat to be applied should be dry. Surface should be dust free by using Air compressor.

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ACTIVITY QAP : OPEN - GRADED PREMIX SURFACING										
SR. NO.	ITEM	TESTS TO BE PERFORMED	METHOD OF TEST	REFERENCE DOC.	PERMISSIBLE LIMIT	EXTENT OF CHECK	AGENCY			REMARKS
							CON	TPIA	PCM	
5	Application of tack coat	Rate of spread of bitumen	Field	Sch 'B' , MORTH Table 900-4	5kg per 10 sqm.	One test per 500m <sup>2</sup> & not less than two tests per day.	P	R/W	A	Under mentioned notes are to be adhered too.
		Temperature of Tack coat	Field	PWD Hand Book 47.3.3	163 °C to 177 °C					
		Record to be maintained by contractor. Plates & weighing balance should be kept at site. Uniform application to be done. Retack-coating is to be done on wheel marks of the dumper. Bitumen spray set fitted on bitumen boiler is to be used. Only in areas that are inaccessible a pressure hand sprayer is to be used.								
Note:- An efficient technical personnel is to be maintained at site by the contractor.										
6	Agg. grading, binder content	Composition of OGPC material	Field /Plant Lab	MORTH 511	As per MORTH table given below	One test per 500 m <sup>2</sup> and not less than 2 test per day.	P	R/W	A	From Table 500-23
		<b>MORTH TABLE 500-23 (OGPC)</b>								
		Aggregates:								
		a) Nominal Stone Size 13.2mm (passing 22.4mm sieve and retained on 11.2mm			0.18M <sup>3</sup>					IS Sieve (mm)



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							CON	TPIA	PCMC	
		sieve)								Cumulative per cent by weight of total aggregate passing 22.4mm 100 13.2mm - 100 11.2mm - 33 5.6mm 0-5 0.075mm 0-5 Binder Content : (3.7%+/-0.3%)
		b) Nominal Stone Size 11.2mm (passing 13.2mm sieve and retained on 5.6mm sieve)			0.09M <sup>3</sup>					
		Total:			0.27M <sup>3</sup>					
		Binder (quantities in terms of straight run bitumen):								
		a) For 0.18m <sup>3</sup> of 13.2mm nominal size stone at 52kg bitumen per m <sup>3</sup>			9.5 kg					
		b) For 0.09 m <sup>3</sup> of 11.2 mm nominal size stone at 56kg bitumen per m <sup>3</sup>			5.1kg					
				Total:	14.6kg					
Note:- An efficient technical personnel is to be maintained at site by the contractor.										





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SR. NO	ITEM	TESTS TO BE PERFORMED	METHOD OF TEST	REFERENCE DOC.	PERMISSIBLE LIMIT	EXTENT OF CHECK	AGENCY			REMARKS	
							CON	TPIA	PCM C		
7	Temperature of hotmix material.	Temp. check	Field	MORTH 511.1.3.4		At regular close intervals or one test per day.	P	R/W	A	SGS shall witness random tests & review other test results. Record to be maintained by contractor.	
		a) Bitum. Mixing									a) 150 to 163°C
		b) Agg. Mixing									b) 155 to 163°C
		c) Mixed Material.									b) 130 to 160°C
		d) While Laying *									d) Min. 125°C
e) While Rolling	e) Min. 100°C										
8	Rolling	Type of Roller	Field	MORTH	As per remarks	Random	P	W	A	Initial rolling by 8-10 Tonnes dead wt. smooth wheeled roller. or vibratory roller.	
		Intermediate rolling by 8-10 Tonnes dead wt. or vibratory roller or 12-15 Tonnes pneumatic roller.									
		Final rolling by 6-8									

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ACTIVITY QAP : OPEN - GRADED PREMIX SURFACING										
SR. NO	ITEM	TESTS TO BE PERFORMED	METHOD OF TEST	REFERENCE DOC.	PERMISSIBLE LIMIT	EXTENT OF CHECK	AGENCY			REMARKS
							CON	TPIA	PCMC	
										Tonnes roller. No rolling marks should be visible and undulations/ uneven surfaces should be made good.
9	Final surface	Camber Check	Field	MORTH 902.3	2.5% to 3%	At 30 mtr. longitudinally	P	W	A	
Note:- An efficient technical personnel is to be maintained at site by the contractor.										

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# ACTIVITY QAP : PREMIX SEAL COAT

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ACTIVITY QAP : PREMIX SEAL COAT										
SR. NO	ITEM	TESTS TO BE PERFORMED	METHOD OF TEST	REFE. DOC.	PERMISSIBLE LIMIT	EXTENT OF CHECK	AGENCY			REMARKS
							CON	TPIA	PCM C	
1	Review of make & grade of bitumen	Visual	Field	Sch 'B'	HP, BP, IOC Ltd. & 60/70	Each lot	P	R	A	Manufacturer's document submitted by contractor to client along with invoices & challans for review.
2	Quality of Bitumen, C.Agg., F Agg.	#	#	#	#	#	#	#	#	# As per Material QAP Tests for Bitumen to be used for Tack coat is also to be done as per Material QAP.
3	Preparation of base	Visual	Field	MORTH	##	Random	P	W	A	## Surface of layer on which tack coat to be applied should be dry. Surface should be dust free by using Air compressor.
4	Application of tack coat	Rate of spread of bitumen	Field	Sch 'B'MORTH Table 900-4	5kg per 10 sqm.	One test per 500m <sup>2</sup> & not less than two tests per day.	P	R/W	A	Record to be maintained by contractor. Plates & weighing balance should be kept at site. Uniform application to be done. Retack-coating is to be done on wheel marks of the dumper. Bitumen spray set fitted on
		Temperature of Tack coat	Field	PWD Hand	163 °C to 177 °C					



Quality Assurance Plan For Road Construction Works For PCMC, Pune										
ACTIVITY QAP : PREMIX SEAL COAT										
SR. NO	ITEM	TESTS TO BE PERFORMED	METHO D OF TEST	REFE. DOC.	PERMISSIBL E LIMIT	EXTENT OF CHECK	AGENCY			REMARKS
							CO N	TPI A	PCM C	
				Book 47.3.3						bitumen boiler is to be used. Only in areas that are inaccessible a pressure hand sprayer is to be used.
Note:- An efficient technical personnel is to be maintained at site by the contractor.										
5	Agg. grading, binder content	Composition of 15mm thick Premix Seal Coat material	Field /Plant Lab	As per PCMC	As per table given below.	One test per 500 m <sup>2</sup> & not less than two tests per day .	P	R/W	A	SGS shall witness random tests & review other test results.Record to be maintained by contractor.
		<i>IS Sieve Designation (mm)</i>	<i>Cummulative per cent by weight of total aggregate passing</i>							
		11.2	100							
		75	0-5							
		Bitumen content, % by mass of total mix#	5.7 % - 6.3%							
6	Temperature of hotmix material.	Temperature check	Field	* MORTH Table 500-5		At regular close	P	R/W	A	SGS shall witness random tests & review other test results.Record to be maintained

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ACTIVITY QAP : PREMIX SEAL COAT										
SR. NO.	ITEM	TESTS TO BE PERFORMED	METHOD OF TEST	REFE. DOC.	PERMISSIBLE LIMIT	EXTENT OF CHECK	AGENCY			REMARKS
							CON	TPIA	PCM	
						intervals or One test daily.				by contractor.
		a) Bitumen Mixing			a) 150 to 165°C					
		b) Aggregate Mixing			b) 150 to 170°C					
		c) Mixed Material.			c) Max. 165°C					
		d) While Laying *			d) Min. 125°C					
		e) Rolling *			e) Min. 90°C					
Note:- An efficient technical personnel is to be maintained at site by the contractor.										
7	Rolling	Type of Roller	Field	MORTH	As per remark	Random	P	W	A	Initial rolling by 8-10 Tonnes dead wt. smooth wheeled roller.or vibratory roller. Intermediate rolling by 8-10 Tonnes dead wt. or vibratory roller or 12-15 Tonnes pneumatic roller. Final rolling by 6-8 Tonnes roller.

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<b>ACTIVITY QAP : PREMIX SEAL COAT</b>										
SR. NO	ITEM	TESTS TO BE PERFORMED	METHOD OF TEST	REFE. DOC.	PERMISSIBLE LIMIT	EXTENT OF CHECK	AGENCY			REMARKS
							CON	TPIA	PCMC	
										No rolling marks should be visible and undulations/ uneven surfaces should be made good.
8	Final surface	Camber Check	Field	MORTH	2.5% to 3%	At 30mtr. interval.	P	W	A	
Note:- An efficient technical personnel is to be maintained at site by the contractor.										

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# Material QAP - Paving block

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<b>MATERIAL QAP</b>									
Item	Tests to be performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
						CON	TPIA	PCMC	
1) Paving block	Visual	Field	IRC: SP:63-2004, Clause No.6.4, Page. No.15 and IS 15658: 2006	Plan dimensions +/- 2mm Thickness +/- 3mm	1 test per 36000 Blocks for 'I' Shape Pav' block & 1 test per 44,000 blocks for 'wavy' shape Pav' block. (or 1test per 1000 sqm area depending on shape of block)	P	W	A	All paver blocks shall be sound and free of cracks or other visual defects.
	Dimension, Aspect ratio, Plan area, Wearing face area & Deviation from squareness.	Lab	IS 15658 : 2006	As per IS 15658 : 2006, Table 2 given below		P	R	A	
	Water absorption	Lab	IRC: SP:63-2004, Clause No.6.4, Page. No.16	Avg.: Max. 5%		P	R	A	
	Compressive strength	Lab	IS 15658 : 2006	As per Table 1 of IS 15658:2006 given below		P	R	A	

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<b>MATERIAL QAP</b>									
Item	Tests to be performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
						CON	TPIA	PCMC	
	Abrasion resistance	Lab	IS 15658 : 2006	As per Tender Doc.		P	R	A	
	Tensile splitting strength	Lab	IS 15658 : 2006	As per Tender Doc.		P	R	A	
	Flexural strength / Breaking load	Lab	IS 15658 : 2006	As per IS 15658:2006 Annex G-7 given below		P	R	A	
Note : All material sampling for lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.									
<b>IS 15658:2006, Table 2 Recommended Dimensions &amp; Tolerance for Paver Blocks.</b>									
	Dimension	Recommended Values	Tolerance Limit for paver Block.						
			Thickness < 100mm	Thickness >/ 100mm					
	1) Width, W	To be specified by manufacturer	+/- 2mm	+/- 3mm					
	2) Length, L	To be specified by manufacturer	+/- 2mm	+/- 3mm					
	3) Thickness, T	50 to 120mm	+/- 3mm	+/- 4mm					
	4) Aspect ratio (L/T)	Maximum : 4.0	-0.2	-0.2					
	5) Arris/	Maximum : 5mm	+/- 1mm	+/- 1mm					

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<b>MATERIAL QAP</b>									
Item	Tests to be performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
						CON	TPIA	PCMC	
	chamfer	Maximum : 7mm							
	6) Thickness of wearing layer	Maximum : 6mm		+2 mm	+2 mm				
	7) Plan area, A <sub>SP</sub>	Maximum : 0.03 m <sup>2</sup>		+0.001 m <sup>2</sup>	+0.001 m <sup>2</sup>				
	8) Wearing face area, A <sub>sw</sub>	Minimum 75 percent of Plan Area		- 1 percent	- 1 percent				
	9) Squareness	Nil		+/- 2mm	+/- 3mm				
<b>IS 15658:2006, Annexure G-7</b>									
	Application			Minimum Breaking Load, KN					
	Residential, pathways/ public pedestrian paths.			2					
	Residential, driveways - Light vehicles /public pedestrian & light vehicle paths.			3					
	Residential driveways - Commercial vehicles/ public pedestrian & commercial vehicle paths.			5					
	Regularly trafficked roads.			6					

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<b>MATERIAL QAP</b>									
Item	Tests to be performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
						CON	TPIA	PCMC	
	Heavy duty/ Industrial roads.			7					
Note : All material sampling for lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.									
<b>IS 15658 : 2006 Table 1 Recommended Grades of Paver Blocks for Different Traffic Categories.</b>									
	Sr. No.	Grade of Paver Block	Comp. Strength at 28 days N/mm <sup>2</sup>		Traffic Category		Min. Thk. Of Paver Block (mm)		
	1	M - 30	30		Non Traffic		50		
	2	M - 35	35		Light Traffic		60		
	3	M - 40	40		Medium Traffic		80		
	4	M - 50	50		Heavy Traffic		100		
	6	M - 55	55		Very Heavy Traffic		120		
<b><i>Paving blocks are to be procured from the manufacturing units approved by SGS fulfilling following details :</i></b>									
	<b><i>1) Paving block factory should be fully automated with a Vibro pressing facility.</i></b>								
	<b><i>2) Mixer with requisite capacity having a digital water meter &amp; moisture control system.</i></b>								
	<b><i>3) Complete set up of laboratory for testing of paving block as per Tender Doc.</i></b>								

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<b>MATERIAL QAP</b>									
Item	Tests to be performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
						CON	TPIA	PCMC	
<b>4) Upto date calibration records.</b>									
<b>5) Other requirements as per SGS factory inspection.</b>									
Note : All material sampling for Lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.									
2) Natural Sand / Crushed sand for bedding.	Gradation	Lab	IRC: SP:63-2004, Clause No.6.5.1	As per Table given below.	1 per source	P	R	A	Single-sized or gap graded sands or sands with excessive amount of fines or plastic fines should not be used.
			IS Sieve Size	% passing					
			9.52 mm	100					
			4.75 mm	95 - 100					
			2.36 mm	80 - 100					
			1.18 mm	50 - 95					
			600 micron	25 - 60					
			300 micron	10 - 30					
			150 micron	0 - 15					
			75 micron	0 - 10					
3) Natural Sand / Crushed sand for filling joints	Gradation	Lab	IRC: SP:63-2004	As per Table given below.	1 per source	P	R	A	
			IS Sieve Size	% passing					
			2.36 mm	100					
			1.18 mm	90 - 100					

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MATERIAL QAP									
Item	Tests to be performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
						CON	TPIA	PCMC	
			600 micron	60 - 90					
			300 micron	30 - 60					
			150 micron	15 - 30					
			75 micron	0 - 10					
Note : All material sampling for Lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.									
a) <b>Base Material:</b> Whenever subgrade is weak (Having CBR value below 5) Use of bound granular material like cement treated crushed rock, requiring a relatively thinner base, should be preferred while for high strength subgrades, unbound crushed rock can be used. The climatic and environmental factors also need to be considered during the choice of base material.									
b) <b>Sub-base material:</b> It includes natural gravel, cement treated gravels & sands and stabilised subgrade material. The quality of sub-base materials should be in confirmannce with IRC: 37-2001									
4) River Sand for concrete activity.	1) Visual	Field	PW & HD Std. Specs	As Per A.6	Random	P	W	A	Visual inspection for Fineness, Silt content & Organic impurites
	2) Fineness Modulus	Lab	PW & HD Std. Specs. and Q.C. Notebook	# Concrete= 2.6 to 3.6 # Masonry, 1st coat Plaster= Not more than 3.0	In the begining & if there is a change of source	-	R	A	Generally all fine agg. shall confirm to IS 383 & relevant portion of is 515. If found unsatisfactory and there is absence of facility at site then it is to be sent to lab for testing in the due course of work even
				# Ashlar masonry, Pointing , 2nd coat Plaster= Not					



MATERIAL QAP									
Item	Tests to be performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
						CON	TPIA	PCMC	
				more than 1.6					after earlier lab tests. <b>Measuring jar to be always kept at Site to check silt of sand.</b>
	3) Organic impurities	Lab	IS - 2386 Part 2	It should be clean & free from foreign material.		-	R	A	
	4) Silt content	Field/ Lab	IS: 383	Not more than 3%		-	W/R	A	
Note : All material sampling for Lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.									
5) Ordinary Portland Cement	1) Visual	Field	Approved Tender Document	As per PW & HD Std. Specs.	Random	P	W	A	Visual inspection for PCMC Approved Make & Grade, Freshness, Date of Mfg., Weight of bag, Floating test.
	2) Initial Setting	Lab	Q.C. Notebook	Not < 30 minutes	For each consignment of 50 T or part thereof.	-	R	A	For lab. testing one cement bag of each consignment is to be sampled.
	3) Final Setting	Lab	Q.C. Notebook	Not > 600 minutes		-	R	A	

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<b>MATERIAL QAP</b>									
Item	Tests to be performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
						CON	TPIA	PCMC	
	4) Fineness by dry sieving	Lab	Q.C. Notebook	Residue < 10% on 90 micron seive		-	R	A	
	5) Specific Gravity	Lab	Q.C. Notebook	3.10 to 3.15		-	R	A	
	6) Soundness (Le Chatelier)	Lab	Q.C. Notebook	Expansion not more than 10mm		-	R	A	## Grade 33/43/53 3 Days 16/23/27
	7) Compressive Strength	Lab	As per IS 4031 (Part 6)-1988	##		-	R	A	7Days 22/33/37 28Days 33/43/53
6) Pozzolona Portland Cement (Subject to PCMC approval)	1) Visual	Field	Approved Tender Document	As per PW & HD Std. Specs.	Random	P	W	A	Visual inspection for PCMC Approved Make & Grade, Freshness, Date of Mfg., Weight of bag, Floating test. MTC.
	2) Initial Setting	Lab	Q.C. Notebook	> 30 minutes	For each consignment of 50 T or part thereof.	-	R	A	For lab. testing one cement bag of each consignment is to be sampled
	3) Final Setting	Lab	Q.C. Notebook	< 600 minutes		-	R	A	
	4) Fineness by dry	Lab	Q.C. Notebook	< 5% on 90 micron seive		-	R	A	

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<b>MATERIAL QAP</b>									
Item	Tests to be performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
						CON	TPIA	PCMC	
	seiving								
	5) Specific Gravity	Lab	Q.C. Notebook	3.0 to 3.05		-	R	A	
Note : All material sampling for Lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.									
6) contd. Pozzolona Portland Cement( <b>Subject to PCMC approval</b> )	6) Soundness (Le Chatelier)	Lab	Q.C. Notebook	Expansion not more than 10mm	For each consignment of 50 T or part thereof.	-	R	A	
	7) Compressive Strength (N/mm <sup>2</sup> )	Lab	As per IS 4031 (Part 6)-1988	###		-	R	A	### 3 Days 16 N/mm <sup>2</sup>
									7Days 22 N/mm <sup>2</sup>
									28Days 33 N/mm <sup>2</sup>
7) Coarse Aggregate	1) Visual	Field	PW & HD Std. Specs	As per A.7	Random	P	W	A	Visual inspection for Porosity, Flakiness, Elongated, Dust content & Size.
	2) Impact value	Lab	Q.C. Notebook, I.S. 2386 ( Pt. 4)	Max. 45%	In the begining & if there is change of source.	-	R	A	Generally all the coarse aggregates shall comply with IS:383 & IS:515..The sieved sample shall be kept at site office for
	3) Crushing value	Lab		Max. 45%		-	R	A	
	4) L.A. value	Lab		Max. 16%		-	R	A	
5) Water	Lab	Q.C.		Max. 5%		-	R	A	

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MATERIAL QAP									
Item	Tests to be performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
						CON	TPIA	PCMC	
	absorption		Notebook , I.S. 2386 (Pt. 3)						comparison during actual execution of work.
	6) Gradation	Lab	Q.C. Notebook ,I.S.2386( Pt. 1)	# 1) 1/4 <sup>th</sup> the min. thickness of member		-	R	A	
	#M.S.A. of agg. should be min. of-			# 2) 6mm less than the min. lateral clear dist. between the bars					
				# 3) 6mm less than cover					

Note : All material sampling for Lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.

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## ACTIVITY QAP -Paving Block

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<b>Quality Assurance Plan For Paving Block Works For PCMC, Pimpri, Pune.</b>									
	<b>Project :</b>	<b>Improvement of road from (vision-2005)</b>							
			<b>ACTIVITY QAP</b>						
<b>Item</b>	<b>Tests to be performed</b>	<b>Method of Test</b>	<b>Reference Document</b>	<b>Permissible Limit</b>	<b>Frequency</b>	<b>Agency</b>			<b>Remarks</b>
						<b>CON</b>	<b>TPIA</b>	<b>PCMC</b>	
1	Subgrade check	Field	IRC: SP:63-2004, Clause No. 8.2 Page. No.19	Surface evenness = within 15mm under a 3 mtr. straight edge.	Random	P	W	A	The water table should be at a min. depth of 600mm below the subgrade. Subgrade should be compacted in layers of 150 or 100mm thickness as per IRC:36-1970. A Crossfall of

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**Quality Assurance Plan For Paving Block Works For PCMC, Pimpri, Pune.**

Item	Tests to be	Method of	Reference	Permissible	Frequenc	Agency			Remarks
			<b>ACTIVITY QAP</b>						
									3% slope to be maintain in subgrade surface.
2	CBR	Field / Lab	IRC: SP:63-2004.	Min. 5 %	Random	P	W / R	A	CBR test to be done on subgrade soil if required.
3	Field Dry density.	Field / Lab	As per Rd. 12	Min 95% of Lab Density.	1 Set of 3 core sample for every 100Sqm. Of each sample.	P	W / R	A	Lab Density Should be as per QC notebook.FDD test to be done on subgrade soil if required.

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**Quality Assurance Plan For Paving Block Works For PCMC, Pimpri, Pune.**

Item	Tests to be	Method of	Reference	Permissible	Frequenc	Agency			Remarks
4	Base and Sub-base	Field	IRC: SP:63-2004, Clause No.8.8.6 Page. No.29	Surface evenness = 10mm deviation from a 3mtr. Straight edge.	Random	P	W	A	Base and Sub-base courses are to be constructed as per standard procedures contained in the relevant IRC specs. like IRC:37-2001, IRC:50-1973, IRC:51-1993, IRC:63-1976, IRC:19-1977. In the case of cement bound base it is to be

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Quality Assurance Plan For Paving Block Works For PCMC, Pimpri, Pune.										
	Project :	Improvement of road from (vision-2005)								
			ACTIVITY QAP							
Item	Tests to be	Method of	Reference	Permissible	Frequenc	Agency			Remarks	
									constructed using roll lean concrete as per IRC:SP-49. Quality control should be as per IRC:SP-11.A Crossfall of 3% slope to be maintain in base & subbase surface.	
Note:- An efficient technical personnel is to be maintained at site by the contractor.										
5	Concreting:									
	a) Mix	Field	As per PW & HD Std. Specs.	As per remark	Random	P	W	A	The proportion of	

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**Quality Assurance Plan For Paving Block Works For PCMC, Pimpri, Pune.**

	<b>Project :</b>	<b>Improvement of road from (vision-2005)</b>							
			<b>ACTIVITY QAP</b>						
<b>Item</b>	<b>Tests to be</b>	<b>Method of</b>	<b>Reference</b> Bd.E , F, B 6, / IS 456.	<b>Permissible</b>	<b>Frequenc</b>	<b>Agency</b>			<b>Remarks</b>
	b) Mixing, Trabnsporting, Placing, Compaction & Finishing	Field	As per PW & HD Std. Specs. Bd.E , F, B 6, / IS 456.	As per remark given below	Random	P	W	A	mix shall be as specified in tender document & shall be maintain by using standard size Box(Pharma).In case of Mix design Weigh batcer shall be used.
The cement concrete shall be mixed mechanically.In no case mixing shall be done for less than 1 to 1.5 minute.									

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Quality Assurance Plan For Paving Block Works For PCMC, Pimpri, Pune.										
	<b>Project</b> :	<b>Improvement of road from (vision-2005)</b>								
			<b>ACTIVITY QAP</b>							
<b>Item</b>	<b>Tests to be</b>	<b>Method of</b>	<b>Reference</b>	<b>Permissible</b>	<b>Frequenc</b>	<b>Agency</b>			<b>Remarks</b>	
	<p>Transportation process shall not take time more than 15min. The concrete shall be placed into its final position, compacted and finished within 30minutes of mixing the water &amp; before setting commences. The method of placing shall be such as to avoid segregation. In case of concrete bedding below paver floor a screed board shall be used to get a level or sloped surface as required for the top of bedding. Top surface shall be rough for good bond. Compaction shall be by using Vibrator needle for good compaction. A Crossfall of 3% slope to be maintained for Concrete surface. In case of lime or cement treated layers in the pavement, at least 14 and 7days respectively curing to be done, before traffic is permitted.</p>									
	c) Slump	Field	As per PW & HD Std. Specs. Bd.E , F, B 6, / IS 456.	As per remark given below	Random	P	W	A		
	<p>For Low Degree of workability-Slump-25-75mm &amp; For Medium degree of workability- Slump-50-100 . Concrete shall have a consistency such that it will be workable in the required position &amp; in the case of R.C.C flow around reinforcing steel also.</p>									
Note:- An efficient technical personnel is to be maintained at site by the contractor.										

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Item	Tests to be	Method of	Reference	Permissible	Frequenc	Agency			Remarks
5) Continue	d) Cohesion & Colour	Field	As per PW & HD Std. Specs. Bd.E , F, B 6, / IS 456.	As per remark	Random	P	W	A	Concrete shall be cohesive & green in colour.
	e) Compressive Strength	Lab	As per PW & HD Std. Specs. B.6.12	Not less than table given below	Random	-	R	A	150mm x 150mm x 150mm -6 Nos. Cube Casted in IS moulds at site for 7 & 28 days Comp.Strengt h Test.
<b>As per Red hand book Specification No. B.6.12</b>									
	Sr.No.	Mix	Compressive Strength at 7 days in Kg/ Sq.cm		Compressive Strength at 28days in Kg/ Sq.cm			Defective concrete having	
	1	1:1:2	158		242				

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	<b>Project :</b>	<b>Improvement of road from (vision-2005)</b>						
			<b>ACTIVITY QAP</b>					
<b>Item</b>	<b>Tests to be</b>	<b>Method of</b>	<b>Reference</b>	<b>Permissible</b>	<b>Frequenc</b>	<b>Agency</b>	<b>Remarks</b>	
	2	1:1.5:3	131		200		strength below 80% of the required strength is liable to be rejected. Concrete of strength upto 80 % of the required strength may be accepted as substandard work at a reduced rate provided such weak concrete is	
	3	1:2:4	105		158			
	4	1:3:6	66		100			
	5	1:4 :8	49		73			

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	Project :	Improvement of road from (vision-2005)								
			<u>ACTIVITY QAP</u>							
Item	Tests to be	Method of	Reference	Permissible	Frequenc	Agency			Remarks	
6	Formwork:								restricted to such members & in such quantities as will not endanger the safety of the structure.	
	Dimension check	Field	As per approved tender doc./drg.	As per remark	Random	P	W	A	Shuttering should be sturdy, new & of good quality without leakages. Trueness of line, level,	

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	Project :	Improvement of road from (vision-2005)							
			ACTIVITY QAP						
Item	Tests to be	Method of	Reference	Permissible	Frequenc	Agency			Remarks plumb, diagonal etc. are to verified.
Note:- An efficient technical personnel is to be maintained at site by the contractor.									

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**Quality Assurance Plan For Paving Block Works For PCMC, Pimpri, Pune.**

Item	Tests to be	Method of	Reference	Permissible	Frequenc	Agency			Remarks
7	Bedding and laying of blocks	Field	As per Sch.'B'IRC:SP:6 3-2004 Clause No.8.4 & 8.4 Page No.23	Thickness should be as per Sch'B'. Loose = 25 to 50mm Compacte d = 20 to 40mm (Preferably 20 to 25mm)	Random	P	W	A	Under mentioned notes are to be adhered to.
<p>The sand should be slightly moist, and the moisture content shall be about 6% to 8% (uniform) by weight. Sand should contain not more than 3% by weight of clay &amp; silt and the materials shall be free from deleterious salts or contaminates.</p> <p>Sand is to be compacted with plate vibrators weighing 0.6 tonnes or more.</p> <p>Laying should commence from edge strip and proceed towards the inner side. Laying should proceed in one direction along the entire width of the area to be paved. While locating the starting line, the following should be considered:</p> <ol style="list-style-type: none"> <li>On a sloping site, start from the lowest point uphill on a continuous basis.</li> <li>In case of irregular sharp edge restraint or strip, it is better to start from straight string line.</li> <li>Influence of alignment of edge restraint on achieving and maintaining laying bond.</li> </ol> <p>Under no circumstances should the blocks be forced or hammered into the bedding sand at the stage of laying. Cut units less than 50mm min. dimensions should not be used. Use of premixed concrete or a sand cement mortar</p>									

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	Project :	Improvement of road from (vision-2005)								
			<u>ACTIVITY QAP</u>							
Item	Tests to be	Method of	Reference	Permissible	Frequenc	Agency	Remarks			
	maybe used.									
Note:- An efficient technical personnel is to be maintained at site by the contractor.										

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	<b>Project :</b>	<b>Improvement of road from (vision-2005)</b>								
			<b>ACTIVITY QAP</b>							
<b>Item</b>	<b>Tests to be</b>	<b>Method of</b>	<b>Reference</b>	<b>Permissible</b>	<b>Frequenc</b>	<b>Agency</b>			<b>Remarks</b>	
7. Continue	<p>For Compaction of the bedding sand and the blocks laid over it, Vibratory plate compactor are used over laid paving units. Such vibratory compaction should be continued till the top of each paving block is level with its adjacent blocks. It is not good practice to leave compaction till end of the day as some blocks may move under construction traffic. Standard compactor may have weight of about 90kg, plate area of about 0.3 Sqm. and apply a centrifugal force of 15KN, While heavy duty compactor may have weigh 300-600kg, have plate area of about 0.5-0.6 Sqm. and apply a centrifugal force of 30-65 KN. After compaction by vibratory plate compactors some 2 to 6 passes of vibratory roller (with rubber coated drums or those of static weight less than 4 tonnes and nominal amplitude of not more than 0.6mm) will further help in compaction of bedding and sand filling. Joint Filling: The joints should be completely filled with sand meeting the desired specification by spreading a thin layer and brooming. following this passes of heavy plate compactor are applied. Dry sand &amp; dry blocks are to be used. If the weather does not allow sand &amp; blocks to be dry, several cycles of application of sand, water sprinkling &amp; plate compaction will be necessary.</p>									
8	Final finish	Field	IRC: SP:63-2004, Clause No.8.8.6 Page. No.29	Joint Width range = 2mm to 4mm. Max. difference in surface level between adjacent paving units =	Random	P	W	A	Under mentioned notes are to be adhered to.	





**Quality Assurance Plan For Paving Block Works For PCMC, Pimpri, Pune.**

	<b>Project :</b>	<b>Improvement of road from (vision-2005)</b>							
			<b>ACTIVITY QAP</b>						
<b>Item</b>	<b>Tests to be</b>	<b>Method of</b>	<b>Reference</b>	<b>Permissible</b>	<b>Frequenc</b>	<b>Agency</b>			<b>Remarks</b>
				+10mm to -15mm					
	1) Percentage of joints outside range = 10% max. along 10mtr. line.								
	2) A Crossfall of 3% slope to be maintain paving block surface.								
	3) The block pavement should be at least 5mm above the manholes, side drains, etc.								
	4) Untill all the joints are completely filled, no traffic should be permitted over the block Pavement.								
Note:- An efficient technical personnel is to be maintained at site by the contractor.									

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# **MATERIAL QAP-STORM WATER &** **PIPE DRAINAGE WORK**

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		Project :	Improvement of road from (vision-2005)							
				MATERIAL QAP						
Sr.No.	Item	Tests to be performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
							CON	TPIA	PCMC	
1	RCC Pipes (Pressure & Non-pressure)	Visual	Field	Sch'B' & Is: 458-2003	As per remarks & details given below.	Per lot with relation to MTC.	-	W	A	Length, Thickness and Diameter & finishing are to be checked. Under mentioned notes are to be adhered to.
<p>Pipes shall be straight &amp; free from cracks except that craze cracks may be permitted. The ends of pipes shall be square with their longitudinal axis so that when placed in a straight line in the trench, no opening between ends in contact shall exceed 3mm in pipes upto 600mm diameter (inclusive), and 6mm in pipes larger than 600mm diameter.</p> <p>The outside &amp; inside surfaces of the pipes shall be dense and hard &amp; shall not be coated with cement wash or other preparation unless otherwise agreed to between the purchaser &amp; the manufacturer or the supplier. The inside surface of the pipes shall be smooth. For better bond, inner surface of the collar may be finished rough.</p> <p>The pipes shall be free from defects resulting from imperfect grading of the aggregate, mixing, or moulding.</p> <p>The pipes shall be free from local dents or bulges greater than 3.0mm in depth and extending over a length in any direction greater than twice the barrel wall thickness.</p> <p>Pipes may be repaired, if necessary, because of accidental injury during manufacture or handling and shall be accepted</p>										

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				MATERIAL QAP						
Sr.No.	Item	Tests to be performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
							CON	TPIA	PCMC	
		if in the opinion of the purchaser, the repair are sound & appropriately finished and cured, and the repaired pipe conforms to the requirements of IS: 458: 2003 specification.								
2	P1, P2, P3 Class (Pressure Pipes) & NP1, NP2, NP3, NP4 Class (Non pressure pipe)	a) Hydrostatic test	Field	IS: 458-2003, MTC, IS 3597-1998	P1, P2, P3 should be tested to a hydrostatic pressure of 0.2 Mpa ( 20 m head), 0.4 Mpa, 0.6 Mpa respectively. Non-pressure pipes shall be	--do--	P	R	A	MTC is to be procured by contractor and submitted to SGS for REVIEW. Pipe should be leak proof.

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		Project :	Improvement of road from (vision-2005)							
				MATERIAL QAP						
Sr.No.	Item	Tests to be performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
							CON	TPIA	PCMC	
					tested to a hydrostatic pressure of 0.07 Mpa ( 7m head.)					
		b) Three-edge load bearing test	Lab	IS: 458-2003.& IS: 3597-1985	As per Table1 to Table7 given in IS: 458-2003	--do--	P	R	A	--do--
Note : All material sampling for Lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.										
2. Continue	P1, P2, P3 Class (Pressure	c) Permeability test	Lab	IS: 458-2003.& IS: 3597-1985	Not exceed 0.3 Cm <sup>3</sup>	--do--	P	R	A	--do--

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				MATERIAL QAP						
Sr.No.	Item	Tests to be performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
							CON	TPIA	PCMC	
	Pipes) & NP1, NP2, NP3, NP4 Class (Non pressure pipe)	d) Compressive strength of concrete	Lab	--do--	As per remark given below.	--do--	P	R	A	The manufacturer shall give a certificate indicating the quantity of cement in the concrete mix.
The concrete quality shall be as per IS: 456 for at least very severe environment exposure condition.(Maximum free water cement ratio-0.45, Minimum cement content - 340 kg/m <sup>3</sup> , Minimum grade of concrete- M35.)										
3	Rubber ring	Visual	Field	IS 5382-1985	As per remark	Per lot with relation to MTC.	P	W	A	To be checked for size and any irregularities & it should be smooth & uniform.Under mentioned notes are to be adhered to.

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				MATERIAL QAP						
Sr.No.	Item	Tests to be performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
							CON	TPIA	PCMC	
		<p>The rings shall be homogeneous, free from porosity, grit, excessive blooms, blisters or other visible surface imperfections. The fin or flash shall be reduced as much as possible and in any case the thickness of it shall not exceed 0.4mm &amp; the width 0.8mm.</p> <p>The rubber shall be free from extractable substances which impart taste, odour or toxicity to water.</p> <p>If the pipe is to convey drinking water, substances, capable of affecting the organoleptic properties of the water, or toxic materials, such as compounds of mercury, antimony, manganese, lead or copper shall not be included in the composition of rings. ( For that MTC is to be varified.)</p>								
4	Bricks 1st Class / 2nd Class	a) Visual	Field	PW & HD Std. Specs	As per A.9	Random	P	W	A	Visual inspection for Size, Colour, Edges, Frog, Soundness, Burning, Breaking & Strength.
		b) Size	Lab	--do--	<i>1st Class Bricks-</i> Length= ± 3.0mm Breadth= ± 1.5mm Depth= ± 1.5mm <i>2nd Class Bricks-</i>	1test for each consignment of 12000 Nos. or part thereof.	-	R	A	Conventional brick size may vary from 22.23 x10.64 x 6.67 cm to 22.86 x 10.8 x



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		Project :	Improvement of road from (vision-2005)							
				MATERIAL QAP						
Sr.No.	Item	Tests to be performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
							CON	TPIA	PCMC	
					Depth= ± 3.0mm					7.62 cm. If IS bricks are used they shall comply with IS 1077-1970
Note : All material sampling for Lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.										
4 (Cont.)	Bricks 1st Class / 2nd Class	c) Water Absorption	Lab	PW & HD Std. Specs	1st Class Bricks- Not more than 20% of its dry wt.	1test for each consignment of 12000 Nos. or part thereof.	-	R	A	2nd Class Bricks shall be similar to 1st Class Bricks except that they shall be slightly overburnt & may not have very sharp edges & crushing may be 10% less than that prescribed for
				IS- 1077-92						
		d) Crushing Strength	Field	PW & HD Std. Specs	1st Class Bricks- Min 43.7 kg/ cm2 when dry.		-	R	A	
					Min 32.2 kg/ cm2 when wet					





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		Project :	Improvement of road from (vision-2005)							
				MATERIAL QAP						
Sr.No.	Item	Tests to be performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
							CON	TPIA	PCMC	
		e) Efflorescence	Lab	IS- 3495 (Part 3)1992	Slight		-	R	A	1st Class Bricks. All other provisions specified for 1st Class Bricks also apply to 2nd Class Bricks For both the Classes.
5	Sand	a) Visual	Field	PW & HD Std. Specs	As Per A.6	Random	P	W	A	Visual inspection for Fineness & Organic impurities
		b) Fineness Modulus	Lab	PW & HD Std. Specs. and Q.C. Notebook	# Concrete= 2.6 to 3.6 # Masonry, 1st coat Plaster= Not	In the beginning & if there is a change of	-	R	A	Generally all fine agg. shall confirm to IS 383 & relevant



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		Project :	Improvement of road from (vision-2005)							
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Sr.No.	Item	Tests to be performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
							CON	TPIA	PCMC	
					more than 3.0 # Ashlar masonry, Pointing, 2nd coat Plaster= Not more than 1.6	source				portion of is 515. If found unsatisfactory and there is absence of facility at site then it is to be sent to lab for testing in the due course of work even after earlier lab tests. <b>Measuring jar to be always kept at site to check silt of sand.</b>
		c) Organic impurities	Lab	IS - 2386 Part 2	It should be clean & free from foreign material.		-	R	A	
		d) Silt content	Field/ Lab	IS: 383	Not more than 3%		-	W/R	A	
Note : All material sampling for Lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.										
6	Coarse Aggregate	a) Visual	Field	PW & HD Std. Specs	As per A.7	Random	P	W	A	Visual inspection for



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Sr.No.	Item	Tests to be performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
							CON	TPIA	PCMC	
										Porosity, Flakiness, Elongated, Dust content & Size.
		b) Impact value	Lab	Q.C. Notebook, I.S. 2386 ( Pt. 4)	Max. 45%	In the beginning & if there is a change of source	-	R	A	Generally all the coarse aggregates shall comply with IS:383 & IS:515. If found unsatisfactory and there is absence of facility at site then it is to be sent to lab for testing in the due course of work even
		c) Crushing value	Lab		Max. 45%		-	R	A	
		d) L.A. value	Lab		Max. 16%		-	R	A	
		e) Water absorption	Lab	Q.C. Notebook , I.S. 2386 (Pt. 3)	Max. 5%		-	R	A	
		f) Gradation (M.S.A. of agg. should be min. of #)	Lab	Q.C. Notebook ,I.S.2386( Pt. 1)	# 1) 1/4 <sup>th</sup> the min. thickness of member		-	R	A	

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Sr.No.	Item	Tests to be performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
							CON	TPIA	PCMC	
					# 2) 6mm less than the min. lateral clear dist. between the bars					after earlier lab tests.
					# 3) 6mm less than cover					
Note : All material sampling for Lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.										
7	Ordinary Portland Cement	a) Visual	Field	Approved Tender Document	As per PW & HD Std. Specs.	Random	P	W	A	Visual inspection for PCMC Approved Make & Grade, Freshness, Date of Mfg., Weight of bag, Floating test.
		b) Initial	Lab	Q.C.	Not < 30 minutes	For each	-	R	A	I.S. 4031 For

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Sr.No.	Item	Tests to be performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks	
							CON	TPIA	PCMC		
		Setting		Notebook		consignment of 50 T or part thereof.				lab. testing one cement bag of each consignment is to be sampled.	
		c) Final Setting	Lab	Q.C. Notebook	Not > 600 minutes		-	R	A		
		d) Fineness by dry sieving	Lab	Q.C. Notebook	Residue < 10% on 90 micron seive		-	R	A		
		e) Specific Gravity	Lab	Q.C. Notebook	3.10 to 3.15		-	R	A		
		f) Soundness (Le Chatelier)	Lab	Q.C. Notebook	Expansion not more than 10mm		-	R	A		## Grade 33/43/53
		g) Compressive Strength (N/mm <sup>2</sup> )	Lab	As per IS 4031 (Part 6)-1988	##		-	R	A		3 Days 16/23/27
											7Days 22/33/37
									28Days 33/43/53		
8	Pozzolona Portland Cement	a) Visual	Field	Approved Tender Document	As per PW & HD Std. Specs.	Random	P	W	A	Visual inspection for PCMC	



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		Project :	Improvement of road from (vision-2005)							
				MATERIAL QAP						
Sr.No.	Item <i>(Subject to PCMC approval.)</i>	Tests to be performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
							CON	TPIA	PCMC	
										Approved Make & Grade, Freshness, Date of Mfg., Weight of bag, Floating test. MTC.
		b) Initial Setting	Lab	Q.C. Notebook	Not < 30 minutes	For each consignment of 50 T or part thereof.	-	R	A	For lab. testing one cement bag of each consignment is to be sampled
		c) Final Setting	Lab	Q.C. Notebook	Not < 600 minutes		-	R	A	
		d) Fineness by dry sieving	Lab	Q.C. Notebook	Not < 5% on 90 micron seive		-	R	A	
		e) Specific Gravity	Lab	Q.C. Notebook	3.0 to 3.05		-	R	A	
		f) Soundness (Le Chatelier)	Lab	Q.C. Notebook	Expansion not more than 10mm		-	R	A	### 3 Days 16
										7Days 22

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		Project :	Improvement of road from (vision-2005)							
				<u>MATERIAL QAP</u>						
Sr.No.	Item	Tests to be performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
							CON	TPIA	PCMC	
		g) Compressive Strength (N/mm <sup>2</sup> )	Lab	As per IS 4031 (Part 6)-1988	###		-	R	A	28Days 33
Note : All material sampling for Lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.										

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# **ACTIVITY- QAP-STORM WATER &** **PIPE DRAINAGE WORK**

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		<b>Project :</b>	<b>Improvement of road from (vision-2005)</b>							
				<b>ACTIVITY QAP</b>						
Sr.No.	Item	Tests to be performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
							CO N	TPI A	PCM C	
1	Excavation	Pit and Trench dimensions	Field	MORTH 2903, Sch'B', IS 783-1985	As mentioned in Remarks column	Random	P	W	A	Width on either side of the pipe shall be a min. of 150mm or 1/4th of the pipe whichever is more and shall not be more than 1/3rd the dia.of the pipe. The sides of the trench shall be as nearly vertical as possible.
2	Bedding	Checking bedding thickness and Material used for bedding	Field	MORTH 2904, Sch'B', IS 783-1985	Compacted thickness shall be Min. 75mm or as per Appendix 'B' of IS: 783-1985 or	Random	P	W	A	The bedding material shall be well graded sand or granular material passing 5.6mm sieve suitably compacted /rammed for 1st class bedding OR concrete cradle bedding.



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		Project :	Improvement of road from (vision-2005)							
				ACTIVITY QAP						
					Sch 'B'					
3	Laying of pipes	Checks as per remarks.	Field	MORTH 2905, Sch'B', IS 783-1985	Where two or more pipes are to be laid adjacent to each other they shall be separated by a distance equal to at least half the dia. of	Random	P	W	A	Pipes are to be laid only after the foundation has been approved. The laying of pipes on the prepared foundation shall start from the outlet and proceed towards the inlet and be completed to the specified lines and grades. Any defective or damaged pipe is to be removed.

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		Project :	Improvement of road from (vision-2005)							
				ACTIVITY QAP						
					the pipe subject to a min. 450mm.					
4	Jointing of pipes. (Rigid)	a) Caulking	Field	MORTH 2906, Sch'B', IS783-1959	13 to 20mm	Random	P	W	A	
Note:- Each pipe should have following mark. a) Name of manufacturer or its trademark. b) Class & size of pipe c) Date of manufacture d) "ISI" mark if applicable.										
Note:- An efficient technical personnel is to be maintained at site by the contractor.										



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		Project :	Improvement of road from (vision-2005)							
				ACTIVITY QAP						
4 (Cont.)	Jointing of pipes. (Rigid)	b) Cement sand mortar joint check	Field	MORTH 2906, Sch'B', IS783-1959	1:1.5 for Pressure pipe 1:2 for Non-pressure pipe.	Random	P	W	A	The caulking shall be employed at both ends in a slope of 1:1. Care shall be taken to fill all voids and excess mortar shall be removed. Curing shall be done for a period of min. 10 days. For jointing pipe lines under light hydraulic pressure the recess at the end of the pipe shall be filled by jute braiding dipped in hot bitumen or suitable compound. The interior surface should be smooth and consistent with the interior surface of the pipe.
		c) Interval of Expansion joint	Field	--do--	Buried pipes = Max.100 m. Exposed	Random	P	W	A	

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Project : Improvement of road from (vision-2005)										
ACTIVITY QAP										
pipes = Max. 45m.										
5	Jointing of pipes. (Flexible)	Placement of Rubber ring	Field	MORTH 2906, Sch'B', IS783-1959	The rubber ring should be in the assigned location of the pipe. (ie. in the groove)	Random	P	W	A	Displaced rubber ring is not acceptable in any case.
6	Gradient	Gradient check	Field	CD. 7.3, Sch 'B"	As mentioned in Remarks column	Random	P	W	A	The pipes shall be laid to the lines and levels shown on the drgs. The slope shall be 1:100 towards the down stream unless mentioned in the drg. or as directed by Engineer.
Note:- Each pipe should have following mark. a) Name of manufacturer or its trademark. b) Class & size of pipe c) Date of manufacture d) "ISI"										

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		<b>Project :</b>	<b>Improvement of road from (vision-2005)</b>							
				<b>ACTIVITY QAP</b>						
mark if applicable.										
Note:- An efficient technical personnel is to be maintained at site by the contractor.										
7	Testing of Pipeline	Hydrostatic test.	Field	IS:783-1985 Clause 15.5	As per IS:783-1985 Clause 15.5.1 to 15.5.5 & remark given	100%	P	W	A	Pipe should be leak proof.Under mentioned notes are to be adhered to.
All pipe line should be tested before being brought into service.Test should be hydrostatic test performed by filling the pipeline with water and raising the pressure to the selected test pressure & maintaining this for sufficient period. In case of large diameter low pressure pipes consideration may be given to the internal testing of joints only.										
8	Brick masonry	a) Line, Level & Plumb	Field	As per approved tender doc./drg.	As per remark	Random	P	W	A	It should be in line, level & complete plumb.
		b) Mortar Proportion	Field	As PWD Red Hand Book,	As per remark given below.#	Random	P	W	A	

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		<b>Project :</b>	<b>Improvement of road from (vision-2005)</b>							
				<b>ACTIVITY QAP</b>						
				Clause no. B.5(a)						
				<p># Cement &amp; sand shall be mixed in specified proportions sand being measured in measuring boxes. The hand-mixed mortar, cement &amp; sand in the specified proportions shall be thoroughly mixed dry on a clean impervious platform by turning over at least 3 times or more till a homogeneous mixture of uniform color is obtained. Fresh &amp; clean water as specified above shall be added gradually through a rose &amp; thoroughly mixed to form a stiff plastic mass of uniform colour. The water cement ratio shall be as per Table given below-</p> <p>For Machine mixed mortar, water cement ratio shall be same. About 5 percent to 10 per cent of mixing water shall be put into the mixer &amp; Sand and cement in the required proportions shall be then added. Only such quantity of mortar shall be prepared as can be used within 30 minutes. The mortar remaining unused after that period or mortar which has particularly hardened or is otherwise damaged shall not be retamped or remixed. It shall be destroyed or thrown away.</p>						
<p>Note:- Each pipe should have following mark. a) Name of manufacturer or its trademark. b) Class &amp; size of pipe c) Date of manufacture d) "ISI" mark if applicable.</p>										
<p>Note:- An efficient technical personnel is to be maintained at site by the contractor.</p>										
		<b>As PWD Red hand Book Specification No.B.5. (a)</b>								
		Cement	Sand	Water Cement ratio	Quantity of water per 50kg of cement					

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				ACTIVITY QAP						
					(litres)					
		1	1	0.25	12.5					
		1	1.5	0.28	14					
		1	2	0.3	15					
		1	2.5	0.35	17.5					
		1	3	0.4	20					
		1	4	0.53	26.5					
		1	5	0.6	30					
		1	6	0.7	35					
		1	8	0.9	45					
8 Contin ue	Brick masonry	c) Thickness of joint	Field	As PWD Red Hand Book, Clause no. B.G.1	As per remark	Random	P	W	A	The thickness of joints in brick work shall be 12mm for conventional bricks and 10mm for I.S type bricks.
		d) Raking of joints	Field	As PWD Red Hand Book,	As per remark	Random	P	W	A	

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		<b>Project :</b>	<b>Improvement of road from (vision-2005)</b>							
				<b>ACTIVITY QAP</b>						
				Clause no. B.G.1.6						
		The joints shall be raked out to a depth, of not less than the thickness of joints when mortar is green.If the racking is not done when the mortar is green chipping of mortar in the joints shall be done without damaging the brickwork. The raked joints shall be cleaned of all loose particles wetted & filled with 1:3 cement mortar pressed & struck smooth with trowel.It shall be watered for 14days.Joints & surface cleaning daily after completion of work								
9	Plastering	a) Mortar proportion	Field	As per PW & HD Std. Specs. B 5, Bd. L	Same as per remark given in brick masonry#	Random	P	W	A	Brick masonry shall be plastered with 1 : 3 cemnt mortar on the inside.
		b) Finishing	Field	As per PW & HD Std. Specs. Bd.V. & B 11.	As per remark	Random	P	W	A	In any continuous face of wall, finishing treatment of any type should be carried out continuously & day to day breabs made.
Note:- Each pipe should have following mark. a) Name of manufacturer or its trademark. b) Class & size of pipe c) Date of manufacture d) "ISI"										

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		<b>Project :</b>	<b>Improvement of road from (vision-2005)</b>							
				<b>ACTIVITY QAP</b>						
mark if applicable.										
Note:- An efficient technical personnel is to be maintained at site by the contractor.										
10	Concreting:	a) Mix	Field	As per PW & HD Std. Specs. Bd.E , F, B 6, / IS 456.	As per remark	Random	P	W	A	The proportion of mix shall be as specified in tender document & shall be maintain by using standard size Box(Pharma).In case of Mix design Weigh batcer shall be used.
		b) Mixing, Trabnsporti ng, Placing, Compactio n & Finishing	Field	As per PW & HD Std. Specs. Bd.E , F, B 6, / IS 456.	As per remark given below	Random	P	W	A	
		The cement concrete shall be mixed mechanically.In no case mixing shall be done for less than 1 to 1.5 minute. Transportation process shall not take time more than 15min. The concrete shall be placed into its final position, compacted and finished within 30minutes of mixing the water & before setting commences. The metod of placing shall be such as to avoid segregation. In case of concrete bedding below paver floor a screed board shall be used to get a level or sloped surface as required for the top of bedding. Top surface shall be rough for good bond. Compaction shall be by using								

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		<b>Project :</b>	<b>Improvement of road from (vision-2005)</b>						
				<b>ACTIVITY QAP</b>					
		Vibrator needle for good compaction.A Crossfall of 3% slope to be maintained for Concrete surface.In case of lime or cement treated layers in the pavement, at least 14 and 7days respectively curing to be done, before traffic is pemitted.							
		c) Slump	Field	As per PW & HD Std. Specs. Bd.E , F, B 6, / IS 456.	As per remark given below	Random	P	W	A
		For Low Degree of workability-Slump-25-75mm & For Medium degree of workbilty- Slump-50-100 . Concrete shall have a consistency such that it will be workable in the required position & in the case of R.C.C flow around reinforcing steel also.							
		d) Cohesion & Colour	Field	As per PW & HD Std. Specs. Bd.E , F, B 6, / IS 456.	As per remark	Random	P	W	A
		e) Compressive Strength	Lab	As per PW & HD Std. Specs.	Not less than table given	Random	-	R	A
									150mm x 150mm x 150mm -6 Nos. Cube Casted in IS moulds at site for 7 & 28 days Comp.Strength Test.

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		<b>Project :</b>	<b>Improvement of road from (vision-2005)</b>							
				<b>ACTIVITY QAP</b>						
				B.6.12	below					
Note:- Each pipe should have following mark. a) Name of manufacturer or its trademark. b) Class & size of pipe c) Date of manufacture d) "ISI" mark if applicable.										
Note:- An efficient technical personnel is to be maintained at site by the contractor.										
<b>As per Red hand book Specification No. B.6.12</b>										
10. Continue	Concreting	e) Compressive Strength	Sr.No.	Mix	Compressive Strength at 7 days in Kg/ Sq.cm	Compressive Strength at 28days in Kg/ Sq.cm				
			1	1:1:2	158	242				
			2	1:1.5:3	131	200				
			3	1:2:4	105	158				
			4	1:3:6	66	100				
			5	1:4 :8	49	73				
Defective concrete having strength below 80% of the required strength is liable to be rejected. Concrete of strength upto 80 % of the required strength may be accepted as substandard work at a reduced rate provided such weak concrete is restricted to such members & in such quantities as will not endanger the safety of the structure.										
11	Formwork:	Dimension check	Field	As per approved tender doc./	As per remark	Random	P	W	A	Shuttering should be sturdy, new & of good quality without leakages. Trueness of line, level, plumb,



<b>Quality Assurance Plan For Storm water &amp; Drainage Pipe Works For PCMC, Pimpri, Pune.</b>									
		<b>Project</b> :	<b>Improvement of road</b> <b>from (vision-2005)</b>						
				<b>ACTIVITY QAP</b>					
				drg.					diagonal etc. are to verified.
Note:- Each pipe should have following mark. a) Name of manufacturer or its trademark. b) Class & size of pipe c) Date of manufacture d) "ISI" mark if applicable.									
Note:- An efficient technical personnel is to be maintained at site by the contractor.									

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# MATERIAL QAP- BUILDING WORK

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**Quality Assurance Plan For Building Construction Works For PCMC, Pune.**

**BUILDING MATERIAL**

Item	Tests to be performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
						CON	TPIA	PCMC	
1) Bricks 1st Class / 2nd Class	1) Visual	Field	PW & HD Std. Specs & as per A.9	As per remark	Random	P	W	A	Visual inspection for Size, Colour, Edges, Frog, Soundness, Burning, Breaking & Strength.
	2) Size	Lab	PW & HD Std. Specs	1st Class Bricks- Length= $\pm 3.0$ mm Breadth= $\pm 1.5$ mm Depth= $\pm 1.5$ mm 2nd Class Bricks- Depth= $\pm 3.0$ mm	1test for each consignment of 50000 Nos or part thereof.	-	R	A	Conventional brick size may vary from 22.23 x10.64 x 6.67 cm to 22.86 x 10.8 x 7.62 cm. If IS bricks are used they shall comply with IS 1077-1970
	3) Water Absorption		PW & HD Std. Specs, IS- 1077-92, IS- 3495 (Part 2) 1992	1st Class Bricks- Not more than 20% of its dry wt. 2nd Class Bricks- Not more than 22% of its dry wt.					

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**Quality Assurance Plan For Building Construction Works For PCMC, Pune.**

**BUILDING MATERIAL**

Item	Tests to be performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
						CON	TPIA	PCMC	
	4) Crushing Strength		PW & HD Std. Specs	1st Class Bricks- Min 43.7 kg/ cm <sup>2</sup> when dry. Min 32.2 kg/ cm <sup>2</sup> when wet.					not have very sharp edges & crushing may be 10% less than that prescribed for 1st Class Bricks. All other provisions specified for 1st Class Bricks also apply to 2nd Class Bricks.
	5) Efflorescence		IS- 3495 (Part 3)1992	Slight					For both the Classes.
<p><b>Note : All material sampling for Lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.</b></p>									
2) Stone for Masonry / Soling	1) Visual	Field	PW & HD Std. Specs & as per A8	As per remark	Random	P	W	A	

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**BUILDING MATERIAL**

Item	Tests to be performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
						CON	TPIA	PCMC	
	<p>The stones to be used in the face shall be tough, hard, dense, sound &amp; durable, resistant to weathering action, reasonably fine-grained, uniform in colour and texture &amp; free from seams cracks or other defects which would adversely affect their strength, durability or appearance. They shall also be free from weathered portion &amp; skin. The exposed surface shall be entirely free from any type of discoloration. Stones shall generally be freshly quarried with clean faces and sharp edges all round and shall be of such a character that it can be wrought to such lines and surfaces, whether curved or plane as may be required. Size and shape of stones shall be as per the requirements of each item.</p>								
	2) Water absorption	Lab	PW & HD Std. Specs & IS- 1124-1957	Shall not absorb water more than 5% of its dry weight	1 test per lot	P	R	A	
3) Hollow & Solid Concrete Blocks	1) Visual	Field	Approved Tender Document	As per remark	Random	P	W	A	Visual inspection for Size, Edges, Cavity, Curing, Breaking & Strength.
	2) Size	Lab	Approved Tender doc.	Length= ± 5mm Ht. & Wd= ± 3mm	20 blocks from every consignment	-	R	A	

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**Quality Assurance Plan For Building Construction Works For PCMC, Pune.**

**BUILDING MATERIAL**

Item	Tests to be performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
						CON	TPIA	PCMC	
	3) Compressive strength	Lab	Appd. Tender Doc. & as per Q.C. Notebook	Min. Av. Comp. Strength should be as per respective Grade	t of 5000 blocks or part thereof				
<b>Note : All material sampling for Lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.</b>									
3) Hollow & Solid Concrete Blocks	4) Block density	Lab	Appd. Tender Doc. & as per Q.C. Notebook	Grade 3.5 to 5.5= Min. 1500 kg/m <sup>3</sup>	20 blocks from every consignment of 5000 blocks or part thereof	-	R	A	To be produced by Contractor from Manf'
	5) Water absorption	Lab	IS- 2185 (part-1)	Not more than 10 % by mass					
	6) Manufacturer's Test Certificate	Lab	Approved Tender Doc.	As per Q.C. Notebook					

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**BUILDING MATERIAL**

Item	Tests to be performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
						CON	TPIA	PCMC	
4) Sand	1) Visual	Field	PW & HD Std. Specs and as Per A.6	As per remark	Random	P	W	A	Visual inspection for Fineness, Silt content & Organic impurities.
	2) Fineness Modulus	Lab	PW & HD Std. Specs. and Q.C. Notebook	# Concrete= 2.6 to 3.6 # Masonry, 1st coat Plaster= Not more than 3.0 # Ashlar masonry, Pointing, 2nd coat Plaster= Not more than 1.6	In the beginning & if there is a change of source.	-	W	A	Generally all fine agg. shall confirm to IS 383 & relevant portion of is 515. If found unsatisfactory and there is absence of facility at site then it is to be sent to lab for testing in the due course of work even after earlier lab tests. Measuring jar to be always kept at Site to Check silt
	3) Organic impurities	Lab	IS - 2386 Part 2	It should be clean & free from foreign particle.					
	4) Silt content	Lab	IS 383	Not more than 3%.					

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						CON	TPIA	PCMC	
<p><b>Note : All material sampling for Lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.</b></p>									
5) Ordinary Portland Cement	1) Visual	Field	Approved Tender Document	As per PW & HD Std. Specs.	Random	P	W	A	Visual inspection for Make & Grade, Freshness, Date of Mfg., Weight of bag, Floating test.
	2) Initial Setting	Lab	Q.C. Notebook	Not < 30 minutes	For each consignment of 50 T or part thereof.	-	R	A	For lab. testing one cement bag of each consignment is to be sampled.
	3) Final Setting	Lab	Q.C. Notebook	Not > 600 minutes					
	4) Fineness by dry sieving	Lab	Q.C. Notebook	Residue < 10% on 90 micron sieve					
	5) Specific Gravity	Lab	Q.C. Notebook	3.10 to 3.15					

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Item	Tests to be performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
						CON	TPIA	PCMC	
	6) Soundness (Le Chatelier)	Lab	Q.C. Notebook	Expansion not more than 10mm					## Grades 33/43/53 3 Days 16/23/27 7Days 22/33/37 28Days 33/43/53
	7) Compressive Strength (N/mm <sup>2</sup> )	Lab	As per IS 4031 (Part 6)-1988	##					
6) Pozzolona Portland Cement <i>(Subject to PCMC approval)</i>	1) Visual	Field	Approved Tender Document	As per PW & HD Std. Specs.	Random	P	W	A	Visual inspection for Make & Grade, Freshness, Date of Mfg., Weight of bag, Floating test. MTC.
	2) Initial Setting	Lab	Q.C. Notebook	> 30 minutes	For each consignment of 50 T or part thereof.	-	R	A	For lab. testing one cement bag of each consignment is to be sampled.
	3) Final Setting	Lab	Q.C. Notebook	< 600 minutes					
	4) Fineness by dry sieving	Lab	Q.C. Notebook	< 5% on 90 micron sieve					



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						CON	TPIA	PCMC	
<b>Note : All material sampling for Lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.</b>									
6) Pozzolona Portland Cement (Subject to PCMC approval)	5) Specific Gravity	Lab	Q.C. Notebook	3.0 to 3.05	For each consignment of 50 T or part thereof.	-	R	A	###3 Days 16 7Days 22 28Days 33
	6) Soundness (Le Chatelier)	Lab	Q.C. Notebook	Expansion not more than 10mm					
	7) Compressive Strength (N/mm <sup>2</sup> )	Lab	As per IS 4031 (Part 6)-1988	###					
7) Coarse Aggregate	1) Visual	Field	PW & HD Std. Specs	As per A.7	Random	P	W	A	Visual inspection for Porosity, Flakiness, Elongated, Dust content & Size.
	2) Impact value	Lab	Q.C. Notebook, I.S. 2386 ( Pt. 4)	Max. 45%	In the beginning & if there is a change of	-	R	A	Generally all coarse agg. shall confirm to IS 383 & relevant
	3) Crushing value	Lab		Max. 45%					
	4) L.A. value	Lab		Max. 16%					

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Item	Tests to be performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
						CON	TPIA	PCMC	
	5) Water absorption	Lab	Q.C. Notebook , I.S. 2386 (Pt. 3)	Max. 5%	source.				portion of is 515. If found unsatisfactory and there is absence of facility at site then it is to be sent to lab for testing in the due course of work even after earlier lab tests.
	6) Gradation #M.S.A. of agg. should be min. of-	Lab	Q.C. Notebook, I.S.2386( Pt. 1)	# 1) 1/4 <sup>th</sup> the min. thickness of member # 2) 6mm less than the min. lateral clear dist. between the bars # 3) 6mm less than cover					
<p><b>Note : All material sampling for Lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.</b></p>									
8) Rough Shahbad/ Tandur/Kota	1) Visual	Field	Approved Tender Doc./ AS per Bd. M. 1, 2	As per remark	Random	P	W	A	Approved Sample stone to be review by SGS.

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Item	Tests to be performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
						CON	TPIA	PCMC	
<p>At its thinnest part no stone shall be thinner than thickness as per Sch. B. The flag stones shall be hard, sound, durable, resistant to wear, rectangular in shape or square &amp; of specified width. They shall have plain surface. Uniformity of size shall generally be maintained for the flags used in any one room. The stone flags shall be without any soft veins, cracks or flaws and shall have a uniform colour. They shall have even natural surfaces free from broken flakes on top &amp; shall be chiselled on edges to half its depth, true and square to ensure uniform width of joint. The evenness of the surface &amp; edges of the slab shall not be marked by careless dressing of slabs &amp; no patching up shall be allowed for the slabs. The edges shall be quite straight. The under face may be left as quarried. Samples of stone slabs to be used &amp; their dressing shall be got approved by the Engineer &amp; the slabs to be used shall confirm to the approved sample.</p>									
9) Polished Shahbad/ Tandur/ Kotah	1) Visual	Field	Approved Tender Doc./ As per Bd.M. 3,4,5	As per remark	Random	P	W	A	Approved Sample stone to be review by SGS.





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Item	Tests to be performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
						CON	TPIA	PCMC	
	<p>1) All the stones shall be square in shape. The dimensions shall be 24.85 x 29.85 cm or other dimensions as specified in the special provisions or directed by the Engineer. Tolerance in thickness shall be +/- 3mm.</p> <p>2) The exposed surface of specified stones shall be machine polished to a smooth, even &amp; true plane &amp; the edges machine cut square &amp; to the required shape when necessary. Samples shall be got approved by the Engineer.</p> <p>3) The thickness of joints shall not exceed 1.5mm.</p> <p>4) Joints shall be grouted with neat cement slurry.</p> <p>5) When the bedding &amp; joints of the flooring have completely set, the surface shall be machine polished to give a smooth, even and true plane to the floor and thoroughly cleaned.</p>								
<p><b>Note : All material sampling for Lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.</b></p>									
10) White Glazed Tiles	1) Visual	Field	Approved Tender Doc./ BD. M12,13	As per approved sample	Random	P	W	A	For Make, Colour, Size, Thickness, Plainness and Finish.
	<p>The tiles shall be of earthenware covered by a glaze thoroughly matured &amp; fitted to the body. The tiles shall be sound, true to shape, flat &amp; free from flaws &amp; other manufacturing defects. The glaze shall be either glossy or Mat as specified.</p>								

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Item	Tests to be performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
						CON	TPIA	PCMC	
	2) Dimension & Surface quality	Lab	IS: 777 - 1988	Plan Dimensions Avg. = +/- 0.8mm, Thickness = +/- 0.4mm	One set of 18 tiles from every 2000 tiles or part thereof	-	R	A	The variation of individual dimension from average value shall not exceed +/- 0.5mm. MTC should be produced by contractor for review.
	3) Water Absorption			Max. 20%					
	4) Crazeing			Tiles have not show any signs of crazeing.					

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Item	Tests to be performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
						CON	TPIA	PCMC	
	5) Impact Resistance			Tiles should be intact, apart from surface marking after test.					
	6) Chemical Resistance			As per remark					The glazed surface of tiles and/or the fittings having a white or cream coloured glossy glaze shall show no modification.

**Note : All material sampling for Lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.**

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Item	Tests to be performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
						CON	TPIA	PCMC	
11) Chequered Tiles	1) Visual	Field	Approved Tender Doc./ Bd. M.33a,b,c	As per remark	Random	P	W	A	Make, Colour, Size, Thickness, Plainness and Finish. The upper layer of tile shall be free from projections, depressions, cracks (hair cracks not included), holes, cavities and other blemishes.
	Finish: The Colour & texture of the wearing layer shall be uniform throughout its thickness. No appreciable difference in the appearance of the tiles, from the point of view of colour of aggregate, its type and its distribution on the surface of the wearing layer shall be present.								
	2) Dimension	Lab	Tolerances as per IS-13801	Length or Breadth = +/- 1mm. Thickness = +/- 5mm.	One set of 18 tiles from every 2000 tiles or part	-	R	A	

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Item	Tests to be performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
						CON	TPIA	PCMC	
	3) Flatness	Lab	Tolerances as per IS-13801	Concavity and Convexity = Max. 1mm	thereof.				
	4) Perpendicularity	Lab	Tolerances as per IS-13801	As per remark					The longest gap between the arm of the 'square' and the edge of the tiles is Max.2% of the edge.
	5) Straightness	Lab	Tolerances as per IS-13801	As per remark					The gap between the thread & the plane of the tile shall not exceed 1 percent of the length of the edge.
	6) Water absorption	Lab	Tolerances as per IS-13801	Max. 10%					

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Item	Tests to be performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
						CON	TPIA	PCMC	
11) Chequered Tiles	7) Wet transverse strength	Lab	Tolerances as per IS-13801	Avg. Min. 3 N/mm <sup>2</sup>	One set of 18 tiles from every 2000 tiles or part thereof.	-	R	A	
	8) Resistance to Wear		Tolerances as per IS-13801	Average Wear- Max.2mm Wear on Individual Speciman-Max. 2.5mm					
12) Ceramic Tiles	1) Visual	Field	Approved Tender Doc./ Bd. M 8,9,10,11	As per approved sample & as per remark	Random	P	W	A	For Make, Colour, Size, Thickness, Plainness and Finish.
	MTC to be provided by contractor to ascertain method of manufacture & Water absorption Group.								
	2) Dimension & surface quality.	Lab	As per IS-13630	Depend on Classification of Ceramic Tiles.	One set of 18 tiles from every 2000 tiles or part thereof.	-	R	A	

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Item	Tests to be performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
						CON	TPIA	PCMC	
<b>Physical Properties</b>									
	3) Water absorption	Lab	As per IS-13630	Depend on Classification of Ceramic Tiles.	One set of 18 tiles from every 2000 tiles or part thereof.	-	R	A	<b>**Manufacturer's Certificate for Review.</b>
	4) Modulus Of Rupture in N/mm <sup>2</sup>								
	5) Scratch hardness of surface(Mohs' scale)								
	a) Glazed tiles								
	b) Unglazed Tile								
<b>Note : All material sampling for Lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.</b>									
12)(Continue ) Ceramic	6) Abrasion resistance	Lab	As per IS-13630	Depend on Classification of	One set of 18 tiles	-	R	A	

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Item	Tests to be performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
						CON	TPIA	PCMC	
Tiles	a) Resistance to deep abrasion of unglazed tiles, removed volume in mm <sup>3</sup>			Ceramic Tiles.	from every 2000 tiles or part thereof.				
	b) Resistance of abrasion of glazed tiles Class I- IV								
	7) Co-efficient of linear thermal expansion from ambient temperature to 100°C (K <sup>-1</sup> )								
	8) Thermal Shock resistance								

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Item	Tests to be performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
						CON	TPIA	PCMC	
	9) Grazing resistance glazed tiles.								
	10) Frost resistance								
	Chemical Properties								
<b>Note : All material sampling for Lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.</b>									
12) Cement Concrete Flooring Tiles	1) Visual	Field	Approved Tender Doc./ Bd. M 8,9,10,11/ As per IS-1237	As per approved sample /	Random	P	W	A	For Make, Colour, Size, Thickness, Plainness and Finish. Manufacturer's Certificate for Review.
	Finish: The Colour & texture of the wearing layer shall be uniform through its thickness. No appreciable difference in the appearance of the tiles, from the point of view of colour of aggregate, its type and its distribution on the surface of the wearing layer shall be present.								

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						CON	TPIA	PCMC	
	2) Dimension	Lab		Length or Breadth = +/- 1mm. Thickness = +/- 5mm.	One set of 18 tiles from every 2000 tiles or part thereof.	-	R	A	In addition the difference in length of side between the longest side & the shorter side in the sample = max. 1mm. & the difference in thickness between the thickest & the thinnest tile in the sample = Max. 3mm
	3) Physical requirements								
	i) Flatness	Lab	Tolerances as per IS-1237-1980	Concavity and Convexity = Max. 1mm		-	R	A	

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						CON	TPIA	PCMC	
	ii) Perpendicularity			As per remark					The longest gap between the arm of the 'square' and the edge of the tiles is Max.2% of the edge.
	iii) Straightness			As per remark					The gap between the thread & the plane of the tile shall not exceed 1 percent of the length of the edge.
<b>Note : All material sampling for Lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.</b>									
12)(continue. ) Cement Concrete	iv) Water absorption	Lab	Tolerances as per IS-1237-1980	Max. 10%	One set of 18 tiles from every	-	R	A	

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Item	Tests to be performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
						CON	TPIA	PCMC	
Flooring Tiles	v) Wet Transverse strength			Avg. Min. 3 N/mm <sup>2</sup>	2000 tiles or part thereof.				
	vi) Resistance to wear.								
	a) For General purpose tiles			Average Wear- Max.3.5mm Wear on Individual Speciman-Max. 4mm					
	b) for heavy duty floor tiles			Average Wear- Max.2mm Wear on Individual Speciman-Max. 2.5mm					
13)Marble Mosaic (Terrazo)	1) Visual	Field	Approved Tender Doc./ Bd.M. 14,15/	AS Per Remark	Random	P	W	A	For Make, Colour, Size, Thickness,Plainness

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Item	Tests to be performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks	
						CON	TPIA	PCMC		
Tiles			As per IS-1237							
	2)Dimension	Lab		Same as given for Cement Concrete Flooring Tiles.	One set of 18 tiles from every 2000 tiles or part thereof.	-	R	A	**Manufacturer's Certificate for Review.	
	3)Physical requirements									
	-Flatness									
	-Straightness									
	Water absorp.									
	**Transverse strength									
**Resist.to wear										
<b>Note : All material sampling for Lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.</b>										
14) Marble	1) Visual	Field	Approved Tender Doc./ As per IS 1130 / Bd.M.16,17	As per approved sample / Bd. M. 16,17,	Each lot	P	W	A	For Colour, Size, Thickness, Blemishes, prominent cracks.	
	2) Dimensions	Lab					-	R		A
	Blocks			Length or Breadth or						

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Item	Tests to be performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
						CON	TPIA	PCMC	
				Thickness- +2%					
	Slabs			Length or Breadth- +2% & Thickness- +/-3%					
	Tiles			Linear dimensions - 4% Thickness 18 to 24mm in the same piece.					
	3) Specific gravity			Min. 2.5					
	4) Moisture absorption.			Max. 0.4% by weight					
	5) Hardness			Min. 3					

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Item	Tests to be performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
						CON	TPIA	PCMC	
15) Granite	1) Visual	Field	Approved Tender Doc./ As per IS 3316 / Bd. M. 37,38,39	As per Remark	1 test per lot	P	W	A	For Colour, Size, Thickness and Blemishes. It should be free from flaws, injurious veins, cavities & similar imperfections that would impair its structural integrity & would adversely affect its strength & appearance.
	For slab bottom face may be rough but the top surface shall be fine dressed & joint faces shall be dressed back square with the top surface for at least 50mm, without hollowness or spalling off.								
	2) Dimensions	Lab	As per IS 3316						
a) Slabs			Length or Breadth- +/-2mm & Thickness- +/- 1mm		1 test per lot	-	R	A	

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						CON	TPIA	PCMC	
	b) Blocks for Masonry			For Facing Blocks- +/- 5mm.					
	3) Compressive Strength			Min. 1000 Kg/cm <sup>2</sup>					
	4) Specific gravity			Min.2.6					
	5) Water absorption.			Max. 0.50%					
16) Synthetic Flooring (PVC)	1) Visual /Mfg. Test Certificate Review	Field	Approved tender doc. / drg	As per Sch B	Each lot /	-	W/R	A	MTC should be approved or Certified by IFB,FIVB,FIBA
	2) Weight					P	W	A	
	3) Thickness					P	W	A	
<b>Note : All material sampling for Lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.</b>									
17) Water	Visual	Field	Approved Tender Doc./ As per A. 5	As per remark	Per source	P	W	A	Inspection for potability & unwanted matter. If found

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**BUILDING MATERIAL**

Item	Tests to be performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
						CON	TPIA	PCMC	
									unsatisfactory to be tested in lab as per IS-269, IS-3025
18) Neeru / Sanla	Visual	Field	Approved Tender Doc./ PW & HD Std. Specs.	As per A. 4	1 test per lot	P	W	A	Visual inspection for Make, Date of Manufacture, Wt. of bag
19) Steel - M.S Bars	1) Visual	Field	Approved Tender Doc./ PW & HD Std. Specs.	As per remark	Each lot	P	W	A	Visual inspection for PCMC Approved Make, rust, scales & cracks, MTC.
	2) Dimension & Wt. per meter.	Field / Lab		As per PCMC Drawing.		P/ -	W/ R	A	Dimension check on field & weight check in lab.

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Item	Tests to be performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
						CON	TPIA	PCMC	
	3) Ultimate Tensile Stress	Lab	Approved Tender Doc./ Q.C. Notebook	Min. 42 kg/mm <sup>2</sup>		-	R	A	Tests are to be as per IS- 226, IS- 1521, IS-1608, IS- 1786
<b>Note : All material sampling for Lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.</b>									
19) Continue Steel -M.S Bars	4) Yield Stress	Lab	Approved Tender Doc./ Q.C. Notebook	a) Upto 20mm dia.= 26kg / mm <sup>2</sup> b) Over 20mm & upto 40mm dia.= 24kg/ mm <sup>2</sup> c) Bars over 40 mm= 24kg / mm <sup>2</sup>	Each lot	-	R	A	
	5) % Elongation			a) Bars below 10mm = 23% b) Bars upto & including 20mm= 23% c) Bars over 20mm= 23%					

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**BUILDING MATERIAL**

Item	Tests to be performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
						CON	TPIA	PCMC	
	6) Cold Bend Test			**					**Test peice shall withstand one complete sample of reverse bent without showing any sign of fracture.
20) Steel - H.Y.S.D Bars	1) Visual / Manufacturer's test certificate review	Field / Lab	Approved Tender Doc./ PW & HD Std. Specs.	As per remark	Random	P	W/R	A	Visual inspection for PCMC Approved Make. All material shall be new, unused & free from defect
	2) Dimension / Weight	Field / Lab	Approved Tender Doc./ PW & HD Std. Spec	AS per PCMC Drawing	Random	P / -	W/R	A	Dimension check on field & weight in lab.

**Note : All material sampling for Lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.**

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**BUILDING MATERIAL**

Item	Tests to be performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
						CON	TPIA	PCMC	
20) Continue Steel -H.Y.S.D Bars	3) Tensile Strength, <i>Min.</i>	Lab	Approved Tender Doc./ IS : 1786-1985	Fe 415: 10% more than the actual 0.2% proof stress but not less than 485 N/mm <sup>2</sup> Fe 500: 8% more than the actual 0.2% proof stress but not less than 545 N/mm <sup>2</sup> Fe 550: 6% more than the actual 0.2% proof stress but not less than 585 N/mm <sup>2</sup>	Each lot	-	R	A	
	4) 0.2 % Proof stress / Yield Stress, <i>Min</i>			Fe 415= 415.0 Fe 500= 500.0 Fe 550= 550.0					

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**BUILDING MATERIAL**

Item	Tests to be performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
						CON	TPIA	PCMC	
	5) % Elongation , <i>Min</i> , on guage length 5.65 $\sqrt{A}$			Fe 415= 14.5 Fe 500= 12.0 Fe 550= 8.0					
	6) Rebend Test			The specimen shall be considered to have passed the test if there is no fracture in the bent portion.					
<b>Note : All material sampling for Lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.</b>									
21) Ironwork	Visual	Field	Approved Tender Doc./ As per A. 10,11,12,13,14	AS per remark	Each lot	P	W	A	Visual inspection for PCMC Approved Make, rust, scales & cracks, MTC.
	Dimension / Wt.			As per Sch 'B' / Drg.					

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Item	Tests to be performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
						CON	TPIA	PCMC	
22) Structural Steel	Visual / Manufacturer's test certificate review	Field / Lab	Approved Tender Doc./ As per A.11	As per A.11	Each lot	P	W/R	A	Visual inspection for PCMC Approved Make, rust, scales & cracks, MTC.
	2) Chemical / Mechanical properties	Lab		As per IS-226, IS-800, IS-1148, IS-1521, IS-1608		-	R	If further tests be necessary they are to be as per IS- 226, IS-1521, IS-1608	
23) Water proofing compound/ Bitumen	Visual / Manufacturer's test certificate review	Field / Lab	Approved Tender Doc./ As per Bd. J	AS per remark	Each lot	P	W/R	A	Make, Batch no., Mfg. date Review with purchase challan.
24)G.I. Sheet & Fastenings	1) Visual	Field	Approved Tender Doc./ As per Bd. R. 5,6,10 / IS-277	AS per remark	Each lot	P	W	A	Visual inspection for PCMC Approved Make, rust, scales & cracks, MTC.
	2)Dimension / Gauge of sheet		IS-277	AS per PCMC Drg. / Sch. 'B'					

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Item	Tests to be performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
						CON	TPIA	PCMC	
	3) Zinc Coating	Lab		As per Tab. Given on page 19		-	R	A	
<b>Note : All material sampling for Lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.</b>									
	<b>Zinc Coating</b>								
	<b>Thickness</b>			<b>Grade of Zinc Coating</b>					
	0.18 to 0.28 (both inclusive)			200					
	0.30 to 0.55 (both inclusive)			220					
	0.63 to 1.0 (both inclusive)			275					
	Above 1.00mm			350					
24)Continue G.I. Sheet & Fastenings	4) Bend Test	Lab	IS-277	Crack or fracture should not be permitted.	One set of 2 samples for every 1000 plain sheets.	-	R	A	Bend test not conducted on sheets intended for corrugation.

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Item	Tests to be performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
						CON	TPIA	PCMC	
	5) Coating Test			As per table givenn below	As per Remark				Frequency-One set of 3 samples each 50mm <sup>2</sup> or 50mm dia. for every 1000 plain sheets.
	<b>Mass of Coating</b>								
	<b>Grade of Coating</b>	<b>Min. Avg. Coating triple spot Test G/m<sup>2</sup></b>			<b>Min.Coating Single spot Test G/m<sup>2</sup></b>				
	600	600			510				
	450	450			380				
	350	350			300				
	275	275			235				
	220	220			190				
	200	200			170				
	180	180			155				
	120	120			100				
<b>Note : All material sampling for Lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.</b>									

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Item	Tests to be performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
						CON	TPIA	PCMC	
25) A.C. Sheet	1) Visual	Field	Approved Tender Doc./ PW & HD Std. Specs.	As per Bd.R. 7,8,9,14,16	Each lot	P	W	A	
	2) Dimension	Field	IS: 1626 (Part 2) : 1994	Length of gutter- +/- 10mm Profile of Gutter & Gutter fitting - +/- 10mm Thickness - +/- 1.5mm					

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Item	Tests to be performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
						CON	TPIA	PCMC	
	3) Impermeability Test	Lab	IS: 1626 (Part 2) : 1994	As per remark		-	R	A	The specimens shall not show during 24hrs. of test any formation of drops of water, except traces of moisture on the lower surface. This test on gutter may be done at any suitable place on the gutter without cutting any separate test piece.

**Note : All material sampling for Lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.**

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Item	Tests to be performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
						CON	TPIA	PCMC	
26) Water Supply & Sanitary ware fittings	Visual / Manufacturer's certificate review	Field / Lab	Approved Tender Doc./ PW & HD Std. Specs.	As per Bd.V	Each lot	P	W/R	A	
27) Paints (Oil) , Acrylic.	Visual	Field	Approved Tender Doc./ PW & HD Std. Specs.	As per approved sample / A 17,17a, 17b, B.21	Each lot	P	WR	A	Make, Batch no., Mfg. date , Literature Review with purchase challan.
28) Colour Wash, Putty, White wash, Distemper, Cement Paint	Visual	Field	Approved Tender Doc./ PW & HD Std. Specs.	As per approved sample / Bd. P	Each lot	P	W/R	A	Make, Batch no., Mfg. date ,Literature Review with purchase challan.

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Item	Tests to be performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
						CON	TPIA	PCMC	
29) Emulsion	Visual	Field	Approved Tender Doc./ PW & HD Std. Specs.	As per approved sample / Bd. P	Each lot	P	W/R	A	Approved Make, Batch no., Mfg. date, Literature Review with purchase challan.
30) Thermo Reflective Paint	Visual	Field	Approved Tender Doc./Drg. /MORTH 803.4	As Per Sch. B	Each lot	P	W/R	A	Approved Make, Batch no., Mfg. date, Literature Review with purchase challan.
<b>Note : All material sampling for Lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.</b>									
31) Polymer Expansion Joints	Visual	Field	Approved Tender Doc./ Drg.	As per approved sample /Sch. B	Random	P	W	A	MTC, Thickness ,Size, Literature for Review.

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Item	Tests to be performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
						CON	TPIA	PCMC	
32) Wood Work	Visual	Field	Approved Tender Doc./ PW & HD Std. Specs.	As per approved sample / B.20	Random	P	W	A	Type of Wood , Glue, Nails, Screws etc. Precaution against decaying, All parts of wood work resting on or set in masonry shall be well painted with 2 coats of hot boiled tar. The tar shall be so applied shall not appear on the exposed timber.
33) Timber	Visual	Field	Approved Tender Doc./ PW & HD Std. Specs.	As per A.16, B.20	1 test per lot	P	W	A	Loose or dead Knots , flaws, warp, etc. It should be free from spongy, sapwood & borer

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Item	Tests to be performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
						CON	TPIA	PCMC	
									holes .
	Water Absorption	Lab	As per A 16.5 & IS 287-1973	###	1 test per lot	P	R	A	
<b>Note : All material sampling for Lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.</b>									
<b>33) Timber (Cont.)</b>	<b>### The max. permissible moisture content for timber for various purpose shall be as during seasoning.</b>								
	<b>Moisture Content (% of over dry wt. of timber)</b>								
	<b>Purpose</b>			<b>Zone 1 Dry Area Annual Rainfall &lt;50cm</b>	<b>Zone 2 Mod. Dry Area Ann. Rainfall 50 to 100 cm</b>	<b>Zone 3 Mod. Humid Area Ann. Rainfall 100 to 200cm</b>	<b>Zone 4 Humid Area Ann. Rainfall &gt;200cm</b>		
	<b>For roof, floor timbers, roof &amp; weather boarding and other carpenter's work.</b>			<b>12</b>	<b>14</b>	<b>17</b>	<b>20</b>		

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Item	Tests to be performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
						CON	TPIA	PCMC	
	For joinery including frames, staircases, moulding the joiner's work.			10	12	14		16	
	Floor & Match boarding			8	10	10		12	
Note:- The above limits may be relaxed for timber intended for temporary construction such as shoring form work bullies, and the like.									
34) Doors, Windows, Ventilators, Partitions, & Furnitures.	Visual	Field	Approved Tender Doc./ Drg. PW & HD Std. Specs.	As per Bd. T / B.20	Each lot	P	W	A	
	2) Dimension	Field		As Per Sch B	Each lot	P	W	A	
Note : All material sampling for Lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.									

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Item	Tests to be performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
						CON	TPIA	PCMC	
35) Glazier's Work	1) Visual	Field	Approved Tender Doc./ PW & HD Std. Specs.	As per Bd. S & remark given below	Random	P	W	A	
	<p><b>Type of Glass, Putty, Moulded wooden fillets, . Make, Batch No. thickness etc. Glass shall be free from specks, bubbles, smoke, veins, air holes, blisters &amp; other defects. Size, wt. check Kg/sq.m as per type of glass. Putty to be used for fixing the glass in wooden frames shall confirm to I.S. 419-1967. For metal frame shall confirm to I. S. 420-1953 Moulded wooden fillets fixed with brass screws.</b></p>								
	2) Dimension	Field	Approved Tender Doc./ PW & HD Std. Specs.	As Per Sch B	Random	P	W	A	
36) Steam Bath, Sauna Bath, Jacuzzi	1) Visual	Field	Approved Tender Doc./ Drg	As Per Sch B	Each lot	P	W	A	Proper functioning to be ascertained.

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Item	Tests to be performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
						CON	TPIA	PCMC	
	2) Dimension , Quality Check	Field / Lab		As per Sch. B	Each lot	P	W/R	A	Make, Size, Literature for Review
<b>Note : All material sampling for Lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.</b>									
37) Aluminium Doors & Windows	1) Visual	Field	Approved Tender Doc./ Drg	As Per Sch. B	Each lot	P	W	A	For Fixtures /Fittings, Make & Quality.
	2) Wt. Per sq.m	Field		6.9 kg/sqm OR as per Sch B	Each lot	P	W	A	
38) Plywood	1) Visual	Field	Approved Tender Doc./ Drg	As Per Sch B	Each lot	P	W	A	For Make ,Size , Thickness and Type.
	2) Water Proof	Lab					W/R		
39) Concrete Kerb Stone	Visual	Field	Approved Tender Doc./ Drg.	As per Sch B	Random	P	W	A	Shape and Finish check.
	Dimension , Quality Check								MTC / Cube strength.



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Item	Tests to be performed	Method of Test	Reference Document	Permissible Limit	Frequency	Agency			Remarks
						CON	TPIA	PCMC	

**Note : All material sampling for Lab testing is to be offered by the contractor to SGS in consultation with PCMC Engineer for readiness.**

## **ACTIVITY QAP- BUILDING WORK**

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**Quality Assurance Plan For Building Construction Work For PCMC, PUNE**

**ACTIVITY - 01 - MARKING**

SR. NO.	ITEM	TESTS TO BE PERFORMED	METHOD OF TEST	REFERENCE DOC.	PERMISSIBLE LIMIT	FREQUENCY	AGENCY			REMARKS
							CON	TPIA	PCM	
1	Off-set distances from boundary/ benchmark/ other references	Dimension check	Field	As per approved layout plan	-	100%	P	W	A	
2	Marking of									

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**ACTIVITY - 01 - MARKING**

SR. NO.	ITEM	TESTS TO BE PERFORMED	METHOD OF TEST	REFERENCE DOC.	PERMISSIBLE LIMIT	FREQUENCY	AGENCY			REMARKS
							CON	TPIA	PCM	
	building									

**ACTIVITY - 02 - EXCAVATION & FOUNDATION**

1	Soil strata	Bearing Capacity	Lab	As per approved tender doc./ Drg. & as per PW & HD Std. Specs. Bd. A / IS 456	As required as per PCMC approved drg. & as per remark	100%	-	R	A	Review of Classification of strata. Type of strata to be verified.
2	Excavation	Pit dimension check	Field			Random	P	W	A	Under mentioned notes are to be adhered to.

The bed of the foundation trenches shall be cleaned of all loose material & well watered, if dry to prevent absorption of water from the green concrete.  
 If the area on which concrete is to be placed is under water, water shall be completely removed. The contractor shall plan, construct, and maintain satisfactorily, safe and pool-proof arrangement for dewatering to ensure safe foundation excavation & laying concrete & masonry in the dry. No pumping shall be allowed during laying of concrete or masonry and for a period of at least 24 hours thereafter unless it is done from a suitable sump separated from concrete or masonry by effective means.

**Note:- An efficient technical personnel is to be maintained at site by the contractor.**

**ACTIVITY - 02 - EXCAVATION & FOUNDATION**

3	Footing									
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**ACTIVITY - 01 - MARKING**

SR. NO.	ITEM	TESTS TO BE PERFORMED	METHOD OF TEST	REFERENCE DOC.	PERMISSIBLE LIMIT	FREQUENCY	AGENCY			REMARKS
							CON	TPIA	PCM	
	a) Levelling course	Dimension check	Field	As per approved tender doc./ Drg. & as per PW & HD Std. Specs. Bd. E / IS 456	As required as per PCMC approved drg. & as per remark	Random	P	W	A	Shuttering should be sturdy, new & of good quality. Trueness of line, level, plumb, diagonal etc. shall be verified.
	b) Shuttering	Dimension check	Field							
	c) Steel	Dimension check	Field							
	d) Covering & other relevant checks	Dimension check	Field							
4	Masonry	-	-	-	-	-	-	-	-	Covered under Masonry work Activity.
5	Plinth	a) Reduced levels	Field	As per approved tender doc./ drg.	As required as per PCMC approved	Random	P	W	A	
		b) Offsets / setbacks								

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**ACTIVITY - 01 - MARKING**

SR. NO.	ITEM	TESTS TO BE PERFORMED	METHOD OF TEST	REFERENCE DOC.	PERMISSIBLE LIMIT	FREQUENCY	AGENCY			REMARKS
							CON	TPIA	PCM	
		c) Dimensions			drg.					

**Note:- An efficient technical personnel is to be maintained at site by the contractor.**

**ACTIVITY - 03 - BRICK MASONRY**

SR. NO.	ITEM	TESTS TO BE PERFORMED	METHOD OF TEST	REFERENCE DOC.	PERMISSIBLE LIMIT	FREQUENCY	AGENCY			REMARKS
							CON	TPIA	PCM	
1	Material	-	-	-	-	-	-	-	-	Covered in material QAP
2	Brick masonry Workmanship	a) Soaking of brick	Field	As per approved tender doc./ drg. And as per PW & HD Std. Specs. Bd. G	As per remark	Random	P	W	A	Brick shall be thoroughly soaked by keeping them under water for atleast 12 hrs. before use.
		b) Laying of bricks.	Field							Frog of bricks shall be laid face up on each layer of mortar.

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							CON	TPIA	PCM	
		c) Line, Level & Plumb	Field							It should be in line, level & complete plumb.
		d) Mortar Proportion	Field							Under mentioned notes are to be adhered to.
<p># Cement &amp; sand shall be mixed in specified proportions. Sand being measured in measuring boxes. The hand-mixed mortar, cement &amp; sand in the specified proportions shall be thoroughly mixed dry on a clean impervious platform by turning over at least 3 times or more till a homogeneous mixture of uniform color is obtained. Fresh &amp; clean water as specified shall be added gradually through a rose &amp; thoroughly mixed to form a stiff plastic mass of uniform colour. The water cement ratio shall be as per Table given below-            For Machine mixed mortar, water cement ratio shall be same. About 5 percent to 10 per cent of mixing water shall be put into the mixer &amp; Sand and cement in the required proportions shall be then added. Only such quantity of mortar shall be prepared as can be used within 30 minutes. The mortar remaining unused after that period or mortar which has particularly hardened or is otherwise damaged shall not be retamped or remixed. It shall be destroyed or thrown away.</p>										
<b>Note:- An efficient technical personnel is to be maintained at site by the contractor.</b>										

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SR. NO.	ITEM	TESTS TO BE PERFORMED	METHOD OF TEST	REFERENCE DOC.	PERMISSIBLE LIMIT	FREQUENCY	AGENCY			REMARKS	
							CON	TPIA	PCM		
<b>ACTIVITY - 03 - BRICK MASONRY</b>											
2. Continue	Brick masonry Workmanship	As PWD Red hand Book Specification No.B.5. (a)									
		Cement	Sand	Water Cement ratio	Quantity of water per 50kg of cement (litres)						
		1	1	0.25	12.5						
		1	1.5	0.28	14						
		1	2	0.3	15						
		1	2.5	0.35	17.5						
		1	3	0.4	20						
		1	4	0.53	26.5						
		1	5	0.6	30						
		1	6	0.7	35						
		1	8	0.9	45						
			e) Thickness of wall, Openings	Field	As per approved tender doc./ drg. And as per PW & HD Std. Specs. Bd. G	As per remark	Random	P	W	A	As required
	f) Thickness of joint	The thickness of joints in brick work shall be									





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							CON	TPIA	PCM	
										12mm for conventional bricks and 10mm for I.S type bricks.
		g) Door & Window Frames								Refer for detailed Activity no. 14 Doors/Windows/Ventilators.
		h) Providing Patli (RCC. Band)								At every 1.0m ht.
		i) Raking of joints								Under mentioned notes are to be adhered to.
		The joints shall be raked out to a depth, of not less than the thickness of joints when mortar is green.If the racking is not done when the mortar is green chipping of mortar in the joints shall be done without damaging the brickwork. The raked joints shall be cleaned of all loose particles wetted & filled with 1:3 cement mortar pressed & struck smooth with trowel.It shall be watered for 14days.Joints & surface cleaning daily after completion of work								



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SR. NO.	ITEM	TESTS TO BE PERFORMED	METHOD OF TEST	REFERENCE DOC.	PERMISSIBLE LIMIT	FREQUENCY	AGENCY			REMARKS
							CON	TPIA	PCM	
Note:- An efficient technical personnel is to be maintained at site by the contractor.										

**ACTIVITY - 04 - STONE MASONRY**

SR. NO.	ITEM	TESTS TO BE PERFORMED	METHOD OF TEST	REFERENCE DOC.	PERMISSIBLE LIMIT	FREQUENCY	AGENCY			REMARKS
							CON	TPIA	PCM	
1	Material	-	-	-	-	-	-	-	-	Covered in material QAP
2	Stone masonry Workmanship	a) Line, Level & Plumb b) Mortar Proportion c) Thickness of wall, Openings	Field	As per approved tender doc./ drg. And as per PW & HD Std. Specs. Bd. H, B5(a), B. 9, Bd. L, BD.L.16.2	AS per remark	Random	P	W	A	Trueness of line, level, & plumb. Mortar mix Proportion as per Sch B, The bed of footing shall be cleared of all loose materials, cleaned and wetted just before laying

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							CON	TPIA	PCM	
										masonry. Bushing shall not project more than 40mm in faces where joints are to be pointed. Raking of joints are to be done. Curing should be proper. All other requirement for mortar proportion shall be same as note given in brick masonry.
3	Pointing Workmanship	a) Visual	Field							Sample pointing is to be done and after approval same is to be followed on

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							CON	TPIA	PCM	
										entire work. Mix Proportion & Type of pointing are to be verified. Curing to be done for atleast for 7 days.
<p>The raked out joints shall be filled with mortar of the specified mix and required consistency &amp; well pressed &amp; rubbed smooth with the mortar projecting beyond the face of the masonry joint by half the thickness of the joint. The protruding strip of the pointing shall have its centre line coinciding with the centre line of the joint. The width &amp; depth of the projection shall be uniform throughout. The junction of horizontal &amp; vertical joints shall be finished neatly. Where joints are not horizontal or vertical as in the case of U.C.R. masonry, the pointing shall be made along the centre line of actual joints to uniform width &amp; depth as directed &amp; junctions of pointing made neatly. The mortar shall not spread over the adjoining stones.</p>										
<p><b>Note:- An efficient technical personnel is to be maintained at site by the contractor.</b></p>										

**ACTIVITY - 05 - SOLING**

SR. NO.	ITEM	TESTS TO BE PERFORMED	METHOD OF TEST	REFERENCE DOC.	PERMISSIBLE LIMIT	FREQUENCY	AGENCY			REMARKS
							CON	TPIA	PCM	

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							CON	TPI	PCM	
							N	A	C	
1	Material	-	-	-	-	-	-	-	-	Covered in material QAP
2	Soling workmanship	Visual	Field	As per approved tender doc./ drg.	##	100%	P	W	A	## Horizontal type soling is to be avoided. Inclined type soling is to be done.

**ACTIVITY - 06 - CONCRETE ( P.C.C and R.C.C.)**

SR. NO.	ITEM	TESTS TO BE PERFORMED	METHOD OF TEST	REFERENCE DOC.	PERMISSIBLE LIMIT	FREQUENCY	AGENCY			REMARKS
							CON	TPI	PCM	
							N	A	C	
1	Material	-	-	-	-	-	-	-	-	Covered in material QAP
2	Concreting:	a) Mix	Field	As per PW & HD Std. Specs. Bd.E , F, B 6, / IS 456.	As per remark	Random	P	W	A	The proportion of mix shall be as specified in tender document

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							CON	TPIA	PCM	
										& shall be maintain by using standard size Box(Pharma).In case of Mix design Weigh batcer shall be used.
		b) Mixing, Trabnsporting, Placing, Compaction & Finishing	Field	As per PW & HD Std. Specs. Bd.E , F, B 6, / IS 456.	As per remark given below	Random	P	W	A	
<p>The cement concrete shall be mixed mechanically.In no case mixing shall be done for less than 1 to 1.5 minute. Transportation process shall not take time more than 15min. The concrete shall be placed into its final position, compacted and finished within 30minutes of mixing the water &amp; before setting commences. The metod of placing shall be such as to avoid segregation. In case of concrete bedding below paver floor a screed board shall be used to get a level or sloped surface as required for the top of bedding. Top surface shall be rough for good bond. Compaction shall be by using Vibrator needle for good compaction.A Crossfall of 3% slope to be maintained for Concrete surface.In case of lime or cement treated layers in the pavement, at least 14 and 7days respectively curing to be done, before traffic is pemitted.</p>										

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							CON	TPIA	PCM	
<b>Note:- An efficient technical personnel is to be maintained at site by the contractor.</b>										

**ACTIVITY - 06 - CONCRETE ( P.C.C and R.C.C.)**

2. continue	Concreting:	c) Slump	Field	As per PW & HD Std. Specs. Bd.E , F, B 6, / IS 456.	As per remark given below	Random	P	W	A	
		For Low Degree of workability-Slump-25-75mm & For Medium degree of workability- Slump-50-100 . Concrete shall have a consistency such that it will be workable in the required position & in the case of R.C.C flow around reinforcing steel also.								
		d) Cohesion & Colour	Field	As per PW & HD Std. Specs. Bd.E , F, B 6, / IS 456.	As per remark	Random	P	W	A	Concrete shall be cohesive & green in colour.
		e) Compressive Strength	Lab	As per PW & HD Std. Specs. B.6.12	Not less than table given below	Random	-	R	A	150mm x 150mm x 150mm -6 Nos. Cube Casted in IS moulds at site for 7 & 28 days

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							CON	TPIA	PCM	
										Comp.Strength Test.
			As per Red hand book Specification No. B.6.12							
			Sr.No.	Mix	Compressive Strength at 7 days in Kg/ Sq.cm		Compressive Strength at 28days in Kg/ Sq.cm			
			1	1:1:2	158		242			
			2	1:1.5:3	131		200			
			3	1:2:4	105		158			
			4	1:3:6	66		100			
			5	1:4 :8	49		73			
			Defective concrete having strength below 80% of the required strength is liable to be rejected. Concrete of strength upto 80 % of the required strength may be accepted as substandard work at a reduced rate provided such weak concrete is restricted to such members & in such quantities as will not endanger the safety of the structure.							
Note:- An efficient technical personnel is to be maintained at site by the contractor.										
<b><u>ACTIVITY - 06 - CONCRETE ( P.C.C and R.C.C.)</u></b>										
3	Formwork	Dimension check	Field	As per approved tender doc./ drg.	As per remark	Random	P	W	A	Shuttering should be sturdy, new & of good quality

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							CON	TPIA	PCM	
										without leakages. Trueness of line, level, plumb, diagonal etc. are to be verified. Starters for columns & lifts to be casted.
4	Reinforcement	Dimension / placement check								100% reinforcement of slab is to be offered for checking to SGS
5	Slab	Concreting	Field	As per approved tender doc./ drg.	As per remark	100%	P	W	A	All relevant checks shall be as per Sr. No. 2,3,4 atleast one day prior to casting of slab
6	Curing & Deshuttering	Visual								Type of curing, Quality of

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							CON	TPIA	PCM	
										concrete, Hacking(Tachha). Deshuttering shall be as per IS 456.
Notes: 1) A sample patch of hacking (0.3 m X 0.3 m) is to be prepared & offered by contractor for approval and same followed.										
2) An efficient technical personnel is to be maintained at site by the contractor.										

**ACTIVITY - 07 - PLASTERING**

SR. NO.	ITEM	TESTS TO BE PERFORMED	METHOD OF TEST	REFERENCE DOC.	PERMISSIBLE LIMIT	FREQUENCY	AGENCY			REMARKS
							CON	TPIA	PCM	
1	Material	-	-	-	-	-	-	-	-	Covered in material QAP
2	PRE - PLASTERING	a) Conduiting for elect., telephone, computer	Field	As per approved tender doc./ drg. And as per PW & HD Std.	As per remark	Random	P	W	A	To be properly embeded in the BBM. Use of machine cutter

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							CON	TPIA	PCM	
		cables		Specs.Bd. L / IS-1630, IS-1661						& then chiselling to be done.
		b) Hacking sample.	Field			Random	P	W	A	A 0.3m x 0.3m sample patch shall be prepared & offered by contractor for approval and same is to be followed. (Apprx. 40 nos. ±5 min. 5mm deep marks shall be maintained)
		b) Precuring	Field			Random	P	W	A	
		c) Use of chicken mesh on joint of R.C.C. & BBM	Field			Random	P	W	A	Atleast 50mm lapping required on either sides of concrete & BBM.
		d) Thickness	Field			Random	P	W	A	Level buttons

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							CON	TPIA	PCM	
										(thiya) to be made.
		e) Mortar proportion	Field			Random	P	W	A	same as note given in brick masonry.
		f) Cement Mortar cubes	Lab	Q.C. Notebook	Refer Remarks Column	Random	P	R	A	Compressive strength @ 28 days of cubes. IS Cube moulds of size 70.6x70.6x70.6m m are to be continuously maintained at site.
										1:3 127-211 Kg/cm <sup>2</sup>
										1:4 -84 - 126Kg/cm <sup>2</sup>
										1:5-56-84Kg/cm <sup>2</sup>
										1:6-35-56Kg/cm <sup>2</sup> .

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							CON	TPIA	PCM	
		g) Sample plaster.	Field	As per approved tender doc./ drg.	As per Sch B	Before Plaster activity starts.	P	W	A	A 1m x 1m sample patch shall be prepared & offered by contractor for approval and same is to be followed.

Note:- An efficient technical personnel is to be maintained at site by the contractor.

**ACTIVITY - 07 - PLASTERING (contd.)**

SR. NO.	ITEM	TESTS TO BE PERFORMED	METHOD OF TEST	REFERENCE DOC.	PERMISSIBLE LIMIT	FREQUENCY	AGENCY			REMARKS
							CON	TPIA	PCM	
3	POST - PLASTERING	a) Trueness for Line, Level, Plumb	Field	As per approved tender doc./ drg. And as per PW &	As per remark	Random	P	W	A	It should be in line, level & complete plumb.

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							CON	TPIA	PCM	
		& Right angle		HD Std. Specs. B 11, Bd. L / IS-1630, IS- 1661						
		b) Finishing	Field	As per approved tender doc./ drg. And As per PW & HD Std. Specs. Bd. L / IS- 1630, IS- 1661	As per remark	100%	P	W	A	As Per approved sample plaster same finish shall be maintained in entire work.Under mentioned notes are to be adhered to.
<p>When no finish is specified the plastered surface shall be rubbed well to an even plane with a wooden float for external surfaces &amp; finished smooth with a steel trowel for internal surface.</p> <p>When cement finished is specified, a coat of pure portland cement slurry 1.5mm thick shall be applied to the plastered surface while the bas coat is still fresh.</p> <p>The cement mortar for sand faced plaster shall have washed Kharsalia or Kasaba or similar type of appoved sand with slightly larger proportion of coarse material. The proportion of cement to sand shall be 1:4.</p> <p>When the finishing coat has hardened, the surface shall be kept wet continuously for 14days.</p>										

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							CON	TPIA	PCM	

**ACTIVITY - 08 - FLOORING / SKIRTING / DADO / STEPS / SILLS**

SR. NO.	ITEM	TESTS TO BE PERFORMED	METHOD OF TEST	REFERENCE DOC.	PERMISSIBLE LIMIT	FREQUENCY	AGENCY			REMARKS
							CON	TPIA	PCM	
1	Material	-	-	-	-	-	-	-	-	Covered in material QAP
2	Bedding/ Surface Preparation for dado/ flooring.	Visual	Field	As per approved tender doc./ drg.And as per PW & HD Std. Specs. Bd. M / IS-1443 Sch. B.	As per remark	Random	P	W	A	Surface shall be hard, rough & clean from all debris. Mortar Mix as per Sch.B. Bedding shall be in uniform level ,thickness,slope. Rough surface for dado. Edges chamfered or moulding or edge polish for steps & sills. The tiles

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							CON	TPIA	PCM	
										shall be sorted for size, color, any deformities and used after pre-curing if required.
3	Final Finish	Visual	Field			100%	P	W	A	Type of tiles, level, slope, line, right angle, joints, cleanness, shade variation, butt filling, cracked tiles, curing etc.. Material of joint filling should be match with shade of tiles. Polishing of Kadappa kitchen otta & shelves.
<p><b>Note:- An efficient technical personnel is to be maintained at site by the contractor.</b></p>										

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**ACTIVITY - 01 - MARKING**

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							CON	TPIA	PCM	

**ACTIVITY - 09 - IRON WORK / STRUCTURAL STEEL**

SR. NO.	ITEM	TESTS TO BE PERFORMED	METHOD OF TEST	REFERENCE DOC.	PERMISSIBLE LIMIT	FREQUENCY	AGENCY			REMARKS
							CON	TPIA	PCM	
1	Material	-	-	-	-	-	-	-	-	Covered in material QAP
2	Dimension / Painting/ Wt. check	Visual	Field	As per approved tender doc./ drg.	Wt. per Rft. or Rm. shall be verified as per Sch 'B'	Random	P	W	A	Rust must be removed by applying rustolene of approved make before applying Zinc chromate primer, DFT : 70-75 micron. Holes are to be of a dia. 1.5 to 2 mm

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							CON	TPIA	PCM	
										larger than the specified dia.of bolts or rivets.
3	Final finish	Visual	Field	As per approved tender doc./ drg. And as per PW & HD Std. Specs. Bd. U, Bd. C, B 18(a), B 19	As per remark	100%	P	W	A	Plumb, level, line type of joints, type of welds are to be checked. Holdfasts or undesired members are to be embedded in masonry / plaster. Approved make nuts & bolts are to be used. Further checks if required are to be done as IS 822, IS 2062, IS 2102, IS 7215, IS 12843

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							CON	TPIA	PCM	

**ACTIVITY - 10 - WATER-PROOFING**

SR. NO.	ITEM	TESTS TO BE PERFORMED	METHOD OF TEST	REFERENCE DOC.	PERMISSIBLE LIMIT	FREQUENCY	AGENCY			REMARKS
							CON	TPIA	PCM	
1	Material	-	-	-	-	-	-	-	-	Covered in material QAP
2	Surface preparation/ Bedding	Visual	Field	As per approved tender doc./ drg. And as per PW & HD Std. Specs. Bd.J	As per remark	Random	P	W	A	Surface shall be clean from all debris & rough (Chipping). Mortar proportion, Slope, Silt % in sand, Brickbat coba, thickness & break joints shall be checked.
3	Final finish	Visual	Field	As per approved tender doc./ drg.	AS per remark given below	100%	P	W/R	A	

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							CON	TPIA	PCM	
	Standing water for a period of 24 hrs shall be kept and verified for leakages. Review of doc. for guarantee of work submitted by Con't. to PCMC.									
	Coving is to be provided at corner & edges. Spout free from mortar debris. The leakage ,failure to stay in place,splitting,pulling loose,bulging,									
	tearing or cracking due to excessive expansion & contraction shall be judged as defective work.									

**Note:- An efficient technical personnel is to be maintained at site by the contractor.**

**ACTIVITY - 11 - ROOFING (G.I. & A.C. SHEETS)**

SR. NO.	ITEM	TESTS TO BE PERFORMED	METHOD OF TEST	REFERENCE DOC.	PERMISSIBLE LIMIT	FREQUENCY	AGENCY			REMARKS
							CON	TPIA	PCM	
1	Material	-	-	-	-	-	-	-	-	Covered in material QAP
2	Laying of Sheets,Fittings	Visual	Field	As per approved tender doc./ drg.And as per PW & HD Std. Specs. Bd.R	As per remark	Random	P	W	A	Lapping min.15cm between two sheets, slope as per drg., J -Bolts , Purlins, Washers
3	Final finish					100%				The visible

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SR. NO.	ITEM	TESTS TO BE PERFORMED	METHOD OF TEST	REFERENCE DOC.	PERMISSIBLE LIMIT	FREQUENCY	AGENCY			REMARKS
							CON	TPIA	PCM	
										surface shall be painted in coats as required as per sch. B

**ACTIVITY - 12 - PLUMBING & SANITARY FITTING**

SR. NO.	ITEM	TESTS TO BE PERFORMED	METHOD OF TEST	REFERENCE DOC.	PERMISSIBLE LIMIT	FREQUENCY	AGENCY			REMARKS
							CON	TPIA	PCM	
1	Material	-	-	-	-	-	-	-	-	Covered in material QAP
2	After GI pipe line work	Hydrostatic pressure test	Field	As per approved tender doc./ drg. And as per PW & HD Std. Specs. Bd.V	As per remark given below.	Random	P	W	A	Make, type, location, clamping, as per Sch. B & approved drawing. The pipes shall be used in standard length. Cut lengths may be

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							CON	TPIA	PCM	
										used where necessary to make up the exact length.
On completion of laying the pipe line & fixing taps, etc., the pipeline shall be tested with a hydraulic pressure of 7kg/ sqcm. or any other pressure if specifically mention in tender document.										
3	Verification of Sanitary wares	Visual	Field	As per approved tender doc./ drg. And as per PW & HD Std. Specs. Bd.V	As per remark	100%	P	W	A	Approved make ,Location, colour,size.
4	Fixing of Sanitary wares & Inspection chamber					Random				GT,NT,IC & all sewer line must be clean from undesirable material. IC. must have sufficient trough in level & slope, so as to avoid water

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							CON	TPIA	PCM	
										logging in chamber.

**Note:- An efficient technical personnel is to be maintained at site by the contractor.**

**ACTIVITY - 13 - WOOD FINISHES**

SR. NO.	ITEM	TESTS TO BE PERFORMED	METHOD OF TEST	REFERENCE DOC.	PERMISSIBLE LIMIT	FREQUENCY	AGENCY			REMARKS
							CON	TPIA	PCM	
1	Material	-	-	-	-	-	-	-	-	Covered in material QAP
2	Final finish	Visual	Field	As per approved tender doc./ drg. And as per PW & HD Std. Specs. Bd. N, B 20	As per remark	100%	P	W	A	A sample is to be prepared & offered by contractor for approval and same followed. Review of manufacturer's

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SR. NO.	ITEM	TESTS TO BE PERFORMED	METHOD OF TEST	REFERENCE DOC.	PERMISSIBLE LIMIT	FREQUENCY	AGENCY			REMARKS
							CON	TPIA	PCM	
										test certificate

**ACTIVITY - 14 - GLAZIER'S WORK**

SR. NO.	ITEM	TESTS TO BE PERFORMED	METHOD OF TEST	REFERENCE DOC.	PERMISSIBLE LIMIT	FREQUENCY	AGENCY			REMARKS
							CON	TPIA	PCM	
1	Material	-	-	-	-	-	-	-	-	Covered in material QAP
2	Fixing & Workmanship	Visual	-	As per approved tender doc./ drg. And as per PW & HD Std. Specs. Bd. S	As per remark	Random	P	W	A	The glass panels properly cut to fit the rebates of the frames and sashes truly with of margin (- 1.5mm.) on all sides. The rebate should not be less than 8mm in the frames &

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							CON	TPIA	PCM	
										sashes.
3	Final finish	Visual	Field			100%	P	W	A	All stains shall be removed from the glass surface. Also Check for cracks.

Note:- An efficient technical personnel is to be maintained at site by the contractor.

**ACTIVITY - 15 - DOORS / WINDOWS / VENTILATORS**

SR. NO.	ITEM	TESTS TO BE PERFORMED	METHOD OF TEST	REFERENCE DOC.	PERMISSIBLE LIMIT	FREQUENCY	AGENCY			REMARKS
							CON	TPIA	PCM	
1	Material	-	-	-	-	-	-	-	-	Covered in material QAP
2	Fixing & Workmanship for door/ window / ventilators.	Visual	Field	As per approved tender doc./ drg. And as per PW & HD Std. Specs. Bd. T, IS: 4021-1995	AS per remark	Random	P	W	A	Trueness in plumb, right angle, Type of joints, Nails, Screws, Thickness. Hold fast at least 3

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SR. NO.	ITEM	TESTS TO BE PERFORMED	METHOD OF TEST	REFERENCE DOC.	PERMISSIBLE LIMIT	FREQUENCY	AGENCY			REMARKS
							CON	TPIA	PCM	
										nos. for door one at centre & 2 nos. at 30 cm from top & bottom. For window & ventilator one no. for 60 cm ht. 2 nos. for above 60 cm ht.
3	Final Finish & Workmanship					100%				Cleanness, Easy movement, Finished surface shall be as per item by oiling or two coats of oil paint of approved coloured and shade . The rebate of frames shall not be oiled. Fixtures &



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SR. NO.	ITEM	TESTS TO BE PERFORMED	METHOD OF TEST	REFERENCE DOC.	PERMISSIBLE LIMIT	FREQUENCY	AGENCY			REMARKS
							CON	TPIA	PCM	
										Fasteners to be check as per approved make, type, location, freely work. etc.

**ACTIVITY - 16 - PAINTING**

SR. NO.	ITEM	TESTS TO BE PERFORMED	METHOD OF TEST	REFERENCE DOC.	PERMISSIBLE LIMIT	FREQUENCY	AGENCY			REMARKS
							CON	TPIA	PCM	
1	Material	-	-	-	-	-	-	-	-	Covered in material QAP
2	Approved Shades	Visual	Field	As per approved tender doc./ drg. And as per PW & HD Std. Specs. Bd. P, B 21	As Per Sch B	Random	P	W	A	A 0.3 m x 1.0m size sample patch shall be prepared & offered by contractor for approval.

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SR. NO.	ITEM	TESTS TO BE PERFORMED	METHOD OF TEST	REFERENCE DOC.	PERMISSIBLE LIMIT	FREQUENCY	AGENCY			REMARKS
							CON	TPIA	PCM	
3	Surface Preparation	Visual	Field		As per remark	Random				Surface shall be repaired with gypsum/ putty, & allow to set hard. All irregularities shall be sand papered smooth & wiped clean. Surface shall be dry & free from dust.
4	Final finish	Visual	Field			100%				Final surface finished as per approved shades.
<b>Note:- An efficient technical personnel is to be maintained at site by the contractor.</b>										

**ACTIVITY - 17 - SYNTHETIC FLOORING**

SR. NO.	ITEM	TESTS TO BE PERFORMED	METHOD OF TEST	REFERENCE DOC.	PERMISSIBLE LIMIT	FREQUENCY	AGENCY			REMARKS
							CON	TPIA	PCM	

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							CON	TPIA	PCM	
							N	A	C	
1	Material	-	-	-	-	-	-	-	-	Covered in material QAP
2	Surface Preparation	Visual	Field	As per approved tender doc./drg And as per Sch. B, IS:13199-1991	AS per remark	Random	P	W	A	Surface should be clean & completely dust free.
3	Bonding	Visual	Field		As per Sch. B	Random	P	W	A	Pasted on grooved PCC floor with water based Acrylic glue.
4	Final finish	Visual	Field		As per Sch. B	100%	P	W	A	Trueness in line,level.

**ACTIVITY - 18 - STEAM BATH/SAUNA BATH/JACUZZI**

SR. NO.	ITEM	TESTS TO BE PERFORMED	METHOD OF TEST	REFERENCE DOC.	PERMISSIBLE LIMIT	FREQUENCY	AGENCY			REMARKS
							CON	TPIA	PCM	
							N	A	C	

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							CON	TPIA	PCMC	
1	Material	-	-	-	-	-	-	-	-	Covered in material QAP
2	Installation & Commissioning	Visual	Field	As per approved tender doc./ drg.	As per Sch B	100%	P	W	A	Working operation.
3	Final finish									Cleanness, level, location.

**ACTIVITY - 19- CONCRETE KERB STONE**

SR. NO.	ITEM	TESTS TO BE PERFORMED	METHOD OF TEST	REFERENCE DOC.	PERMISSIBLE LIMIT	FREQUENCY	AGENCY			REMARKS
							CON	TPIA	PCMC	
1	Material	-	-	-	-	-	-	-	-	Covered in material QAP
2	Casting at site	Concrete Cube	Field	As per approved tender doc./ drg.	As per Sch B	Random	P	W	A	Concrete Mix, Mould sizes.
3	Final finish	Visual				100%				Trueness in line, level, plumb.

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							CON	TPIA	PCM	
										Type of curing.
<b>Note:- An efficient technical personnel is to be maintained at site by the contractor.</b>										

**ACTIVITY - 20 - PLYWOOD WORK**

SR. NO.	ITEM	TESTS TO BE PERFORMED	METHOD OF TEST	REFERENCE DOC.	PERMISSIBLE LIMIT	FREQUENCY	AGENCY			REMARKS
							CON	TPIA	PCM	
1	Material	-	-	-	-	-	-	-	-	Covered in material QAP
2	Verification of Plywood	Visual	Field	As per approved tender doc./ drg.	As per remark & Sch B	Random	P	W	A	Approved make plywood to be verified at site by SGS. MTC to be reviewed.
3	Final finish					100%				Under mentioned notes are to be adhered to.

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							CON	TPIA	PCM	
	The covered wood work in contact with masonry shall be finished with a coat of hot coal tar. The facing of lining shall be finished as mentioned in the item with varnishing, french polishing or waxing as per Bd.N									

**ACTIVITY - 21- ALUMINIUM DOOR & WINDOW**

SR. NO.	ITEM	TESTS TO BE PERFORMED	METHOD OF TEST	REFERENCE DOC.	PERMISSIBLE LIMIT	FREQUENCY	AGENCY			REMARKS
							CON	TPIA	PCM	
1	Material	-	-	-	-	-	-	-	-	Covered in material QAP
2	Final finish	Visual	Field	As per approved tender doc./ drg.	As per Sch B. & as per remark.	100%	P	W	A	Trueness in plumb, right angle, line & level. Wool pile to shutter side rail, Drain hole at bottom rail. Anti lifter at top rail. Working of lock ,Pivot & floor

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							CON	TPIA	PCM	
										spring. Gap between aluminium window and plaster is to be avoided. Sealant is to be used to close such gaps.
<b>Note:- An efficient technical personnel is to be maintained at site by the contractor.</b>										

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