



## **DRAFT TENDER PAPERS**

**Name of Work :- Const. Of Various Anganwadi Building in Dascroi Taluka  
Dist. Ahmedabad Package No. AHD/ANGWNADI/12 (2026-2027) (Zanu-1,  
Gatrad-5, Pardhol-3 ) Total -3**

D.T.P. Cost.              Rs. 3598480.50

<b>Sr. No.</b>	<b>Name of Work</b>	<b>No.</b>
1	<b>Const. Of Various Anganwadi Building in Dascroi Taluka Dist. Ahmedabad Package No. AHD/ANGWNADI/12 (2026-2027) (Zanu-1, Gatrad-5, Pardhol-3 ) Total -3</b>	1

**GOVERNMENT OF GUJARAT  
ROADS & BUILDING DEPARTMENT  
SACHIVALAY, GANDHINAGAR**

## **ANNEXURE – II Notice Inviting On-Line Tender**

Details about Tender :-Tender Notice No. 03    2026-2027

(Including as per Corrigendum)

Department Name	:-	(R&B) Dept. Gandhinagar
Circle	:-	Superintending Engineer Ahmedabad Panchayat ( R & B) Circle L.D. Engineering Collage Compound, Navrangpura Ahmedabad
Division	:-	Executive Engineer, R & B Panchayat Division Laldarwaja, Bhadra Ahmedabad-380001
IFB No.	:-	Tender Notice No. 03 of 2026-2027
Name of Project	:-	Building
Name of Work	:-	<b>Const. Of Various Anganwadi Building in Dascroi Taluka Dist. Ahmedabad Package No. AHD/ANGWNADI/12 (2026-2027) (Zanu-1, Gatrad-5, Pardhol-3 ) Total -3</b>
Estimated Contract Value (INR)	:-	Rs. 3598480.50
Period of Completion (in Months)	:-	9 (Nine ) Months
Bidding Type	:-	Single bid system
Bid Call (Nos)	:-	1
Tender Currency Type	:-	Single
Tender Currency Settings	:-	Indian Rupee (INR)
Joint Venture	:-	Not Applicable
Rebate	:-	Applicable

### **Amount Details**

Bid Document Fee	:-	Rs. 1500/-
Bid Document Fee Payable To	:-	Executive Engineer, R & B Panchayat Division Ahmedabad
Bid Security / EMD (INR)	:-	Rs. 36000.00/-
Bid Security / EMD in favour of	:-	Executive Engineer, R & B Panchayat Division Ahmedabad

### **Tender Dates**

Bid Document Downloading Start Date	:-	14/5/2026                      hrs 12.00
Bid Document Downloading End Date	:-	05/06/2026                      hrs 18.00
Price Bid Opening Date	:-	06/06/2026                      hrs 18.00
Bid Validity Period	:-	<b>120days from the Date of Price bid Opening</b>
Submission of certain documents etc. in person in the office of the E.E. (R&B) Division, Ahmedabad		Submission of EMD. Tender fee and other Documents during office hours Up to date 06-06-2026 to 11-06-2026 in the office of the Executive Engineer R and B Panchayat Division, Laldarwaja Ahmedabad
Remarks	:-	Demand Draft for EMD and Tender fee shall be submitted in Electronic Format Only thorough Online By Scanning While Uploading the bid. This submission shall mean that EMD and tender fee are received Accordingly offer of those shall be opened whose EMD and tender fee is received electronically. However for the purpose of realization of D D bidder shall sand the D D in original through RPAD so as to reach to Executive

		<p>Engineer R and B Panchayat Division Jilla Panchayat Bhavan Laldarwaja Ahmedabad-380001 Within 7 days from the last date of uploading. Penaltative action for not submitting D D in original to E E by bidder shall be initiated. D D for Exemption Certificate is not necessary However Exemption Certificate shall have to be submitted electronically through online.</p> <p><b><u>Amount of Bank Solvency must be 20 percentage of Amount put to tender</u></b></p> <p>All the documents in supporting of bid and prequalification documents shall be submitted in electronic format only through online by scanning and hard copy will not be accepted and considered.</p>
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#### **Other Details**

Officer Inviting Bids	:-	Executive Engineer, R & B Panchayat Division Ahmedabad
Bid Opening Authority	:-	Executive Engineer, R & B Panchayat Division Ahmedabad
Address	:-	Office of the Executive Engineer, R & B Panchayat Division Ahmedabad Ph. No. (079-25511608)

#### **General Terms and Conditions**

- (1) Bidders can download the tender document free of cost from the website.
- (2) Bidders have to submit Technical bid as well as Price bid in Electronic for only on nprocure website till the Last Date & time for submission.
- (3) Offers in physical form will not be accepted in any case.
- (4) Free vendor training camp will be organized every Saturday between 4.00 to 5.00 P.M. at (n)code solutions-A Division of GNFC Ltd., Bidders are requeste take benefit of the same.

Bidders who wish to participate in online tenders will have to procure / should h legally valid Digital Certificate as per Information Technology Act-2000 using w they can sign their electronic bids. Bidders can procure the same from any of license certifying Authority of India or can contract (n)code solutions-A divisio GNFC Ltd, who are licensed Certifying Authority by Govt. of India.

All bids should be digitally signed, for details regarding digital signature certificate related training involved the below mentioned address should be contacted:

(n) Code Solutions

A division of GNFC

301, GNFC Infotower, Bodakdev,

Ahmedabad – 380 054 (India)

Tel: +91 26857316 / 17 / 18

Fax: +91 79 26857321

E-mail: nprocure@gnvfc.net

Web-site: www.rnb.nprocure.com

Toll Free: 1800-233-1010(Ext. 321)

# **SPECIAL CONDITIONS & GENERAL RESOULATION**

**GENERAL INSTRUCTIONS:-**

1. The fees for on line tender document will not be refunded under any circumstances.
2. EMD in the form specified in tender document only shall be accepted.
3. Tender without Tender document fees, Earnest Money Deposit (EMD) and which do not fulfill all or any of the condition of submitted incomplete in any shall not be accepted.
4. Condition tender shall not be accepted.
5. The tender notice shall form a part of tender documents.
6. The tenders are advised to read carefully the Instruction for Tenderer and Eligibility Criteria contained in the tender documents.
7. The internet site address for E-Tender is <https://rnb.nprocure.com> and that to corporate web site is [www.nprocure.com](http://www.nprocure.com)
8. Free training camp for bidders will be organized on every saturday between 1.00 to 5.00 PM at (n) code solutions. A division of GNFC, 301, GNFC Infotower, Bodakdev, Ahmedabad-380054 (Indian) Bidders are requested to take benefit of the same.
9. The R & B reserves the right to reject any or all tenders without assignning and reason there of.
10. Detailed working drawings for the work can be viewed only by Autocad version while on line tender down loading.

બાંધકામના મટીરીયલ્સ તેમજ કોમ્પોનેન્ટ્સ  
સેમ્પલની ગુણવત્તા માટેના પશ્ચિક્ષણ ૯૦ ટકા

પરીક્ષણ સ્થળ પર તથા ૧૦ ટકા પરીક્ષણ  
માન્ય લેબોરેટરી / ગેરી ધ્વારા કરાવવા બાબત.

ગુજરાત સરકાર  
માર્ગ અને મકાન વિભાગ  
પરિપત્ર ક્રમાંક પરચ/૧૦૨૦૦૭-૨૮/સ  
સચિવાલય ગાંધીનગર  
તારીખ ૧૬/૨/૨૦૦૮

પરિપત્ર:-

બાંધકામના મટીરીયલ્સ તેમજ કોપેનેન્ટીના સેમ્પલની ગુણવત્તા માટેના પરિક્ષણ હાલ ગેરી કે માન્ય સંસ્થા (લેબોરેટરી) મારફતે કરવામાં આવે છે. કામોની પ્રગતિની સમીક્ષા દરમિયાન ક્ષેત્રીય અધિકારીઓ તરફથી જાણવા મળેલ છે કે ઉક્ત હયાત પ્રક્રિયામાં ટેસ્ટીંગ પરિણામો વિલંબથી મળે છે. જેમાં સમય પણ ખુબ વ્યતિત થાય છે. ઈજારદાર એસોસીયેશન તરફથી આવી રજુઆતો મળે છે. આથી આ મુશ્કેલી ધ્યાને લેતા ઈજારદાર ધ્વારા જે તે માટે સ્થાપવામાં આવતી લેબોરેટરીમાં સ્થળ પર જ પરીક્ષણ કરવામાં આવે તો વિલંબ નિવારી શકાય તે બાબત વિચારણા હેઠળ હતી પુખ્ત વિચારણાના અંતે નીચે મુજબની નીતી હાલના તબક્કે અનુસરવા નક્કી કરવામાં આવ્યું.

પ્રવર્તમાન પધ્ધતિમાં ફેરફાર કરી ફીક્વન્સી અનુસાર જરૂરી પરિક્ષણો પૈકી ૧૦ ટકા માન્ય લેબોરેટરી ધ્વારા અને ૯૦ ટકા ફીલ્ડ લેબોરેટરી ધ્વારા કરાવવાના રહેશે. જેમા નીચે દર્શાવેલ પરિક્ષણો સ્થળ પર કરવાના રહેશે છે.

એ	એગ્રીગેટ	(૧) ગ્રેડેશન (૨) ફ્લેકીનેશ અને ઈલોગેશન વેલ્યુ (૩) ઈમ્પેક્ટ વેલ્યુ
બી	માટી	(૧) ફિલ્ડ એફડીડી અને એફએમસી (૨) સીવ એનાલીસીસ
સી	રેતી	(૧) ગ્રેડેશન
ડી	ઈટો	(૧) ડાયમેનશન અને ટોલરન્સ ટેસ્ટ
ઈ	કોકીટ	(૧) નોન ડીસ્ટ્રીક્ટીવ ટેસ્ટ (એલ્ટ્રા સોનીક ટેસ્ટીંગ પધ્ધતિથી)
એફ	બીટયુમીનસ મીકસ	(૧) ડામરની ટકાવારી

શરતો :-

૧. ઈજારદારે કામની ગુણવત્તા માટે ધારા ધોરણ પ્રમાણેની અને ઉપર જણાવેલ પરિક્ષણો માટે પ્રમાણિત થયેલ જરૂરી તમામ સાધનો સહિતની ફિલ્ડ ટેસ્ટીંગ લેબોરેટરી સ્વ ખર્ચે કામના સ્થળ યોગ્ય જગ્યા ઉપર સ્થાપવાની રહેશે. રસ્તાના કામ માટે લાગુ પડતા પ્લાન્ટના સ્થળને કામનુ સ્થળ ગણી શકાય.
૨. ધારા ધોરણ પ્રમાણેના પરિક્ષણોની સંખ્યા પૈકી ૮૦ ટકા પરિક્ષણ ફિલ્ડ લેબોરેટરીમાં ઈજારદારના અધિકૃત ક્વોલીફાઇડ ઈજનેર જેઓને સંબંધિત કાર્યપાલક ઈજનેરશ્રીએ આઈ કાર્ડ આપેલ હોય તેમના ધ્વારા ખાતાના ના.કા.ઈ./ મ.ઈ./અ.મ.ઈ./ ની હાજરીમાં જ કરવાના રહેશે અને પરિક્ષામોમાં સંયુક્ત સહીઓ કરવાની રહેશે જ્યારે ૧૦ ટકા પરિક્ષણ ગેરી/ સરકાર ધ્વારા માન્ય લેબોરેટરી મારફતે કરાવવાના રહેશે.
૩. કુલ પરિક્ષણોના ૮૦ ટકા પરિક્ષણ એક જ સ્થળે એકજ સમયે એકજ તબક્કામાં નહીં કરતા કામની પ્રગતિ મુજબ જે તબક્કાએ જે તે કામગીરીને અનુરૂપ જે મટીરીયલ્સ વાપરવાનું થતું હોય તદઅનુસાર શરુઆપના તબક્કામાં રાખવું વચ્ચેના તબક્કામાં તેમજ આખરી તબક્કામાં કરાવવાનું રહેશે. આમ છતાં આ બાબતે સ્થાનિક કક્ષાએથી ના.કા.ઈ.શ્રીએ જરૂરીયાત મુજબ તબક્કાવાર પરીક્ષણો નક્કી કરવાના રહેશે.
૪. ગુણવત્તા નિયમન ધારા ધોરણ પ્રમાણેના બધાજ રજીસ્ટર નિયમિત રીતે નિભાવવાના રહેશે. અને તે જે તે સ્થળે લેબોરેટરીમાં ઉપલબ્ધ રહે તેમ રાખવાના રહેશે.
૫. જો કોઈ કારણસર ટેસ્ટીંગના સાધન અપ્રાપ્ય હોય અથવા વસાવવામાં સમય જાય તેમ હોય કે વ્યવહાર ન હોય (જેમ કે ઇલેક્ટ્રોમેટ્રિક બેરીંગ) તો આવા પરીક્ષણો સરકાર માન્ય સંસ્થાઓમા કરાવી શકાશે. અને આ બાબતનો નિર્ણય સંબંધિત કા.ઈ.શ્રી/ ના.કા.ઈ.શ્રી એ કરવાનો રહેશે.
૬. વિભાગના ક્ષેત્રિય તાંત્રિક સ્ટાફે ના.કા.ઈ./ મ.ઈ./અ.મ.ઈ એ તેમજ ઈજારદારના તાંત્રિક સ્ટાફ ધ્વારા ગેરીમાં પરિક્ષણ જાતે કરવાનો સંતોષકારક અનુભવ મેળવી આ બાબતનું ગેરીનું પ્રમાણપત્ર પણ મેળવવાનું રહેશે. જે તે જિલ્લા પ્રાદેશિક સ્તરે ગેરીની લેબોરેટરીમાં કોર્ષ કન્ટકટ કરવા માટે જરૂરી ફી જે તે વિભાગના કા.ઈ.શ્રીએ ચુકવવાની રહેશે અને આ કાર્યવાહી સમયબદ્ધ પુર્ણ થાય તે માટે સંબંધિત અ.ઈ.શ્રીએ આ કામગીરીની વખતોવખત સમીક્ષા કરવાની રહેશે.
૭. આ પરિપત્રથી ૮૦ ટકા પરિક્ષણો લેબોરેટરીમાં કરવાનો અમલ તા.૧/૧/૦૮ થી કરવાનો રહેશે.

(આર.કે. ચૌહાણ)

ખાસ ફરજ પરના અધિકારી (વિ.યો)  
માર્ગ અને મકાન વિભાગ

પ્રતિ,

૧. માન. મંત્રીશ્રી (મા.મ) વિભાગના અંગત સચિવશ્રીની જાણ સારુ.
૨. મુ.ઈ.શ્રી (મા.મ.) અને અ.સ.શ્રી માર્ગ અને મકાન વિભાગ સચિવાલય ગાંધીનગર
૩. મુ.ઈ.શ્રી (પંચા) અને અ.સ.શ્રી માર્ગ અને મકાન વિભાગ સચિવાલય ગાંધીનગર
૪. મુ.ઈ.શ્રી(ને.હા.) અને અ.સ.શ્રી માર્ગ અને મકાન વિભાગ સચિવાલય ગાંધીનગર
૫. મુ.ઈ.શ્રી(પા.યો) અને અ.સ.શ્રી માર્ગ અને મકાન વિભાગ સચિવાલય ગાંધીનગર
૬. મુ.ઈ.શ્રી(ગુનિ.) અને અ.સ.શ્રી માર્ગ અને મકાન વિભાગ સચિવાલય ગાંધીનગર
૭. નિયામકશ્રી(એસટીસી) સ્ટાફ ટ્રેનીંગ કોલેજ ગાંધીનગર
૮. મુ.ઈ.શ્રી (પીએપી) માર્ગ અને મકાન વિભાગ સચિવાલય ગાંધીનગર
૯. નાણાકીય સલાહકાર શ્રી (મા.મ. વિ.) નાણા વિભાગ સચિવાલય ગાંધીનગર
૧૦. સર્વે અ.ઈ.શ્રીઓ મા.મ. વર્તુળ પેટા/ મા.મ. વર્તુળ /ને.હા. વર્તુળ એક્સપ્રેસ-વે-વર્તુળ/પાટનગર યોજના વર્તુળ
૧૧. સર્વે કા.ઈ.શ્રીઓ ઉપર્યુક્ત વર્તુળો હસ્તકના સર્વે વિભાગો
૧૨. સર્વે તાંત્રિક અધિકારીશ્રીઓ (ના.કા.ઈ.શ્રીઓ સહિત)
૧૩. સર્વે પ્રોજેક્ટ શાખાઓ (રસ્તાને લગતી) માર્ગ અને મકાન વિભાગ સચિવાલય ગાંધીનગર
૧૪. સીલેક્ટ ફાઈલ.



ટેન્ડરીત્રગમાં ટેન્ડર ફી અંગેનો ડ્રાફ્ટ ચેકસ્કેન  
કરી ઈ ટેન્ડરીગના અન્ય ડોક્યુમેન્ટ સાથે રજુ કરવા  
અને ટેન્ડર મોકલવા બાબત.

ગુજરાત સરકાર  
માર્ગ અને મકાન વિભાગ  
પરિપત્ર ક્રમાંક પરચ-૧૦૨૦૦૮-૫-સ  
સચિવાલય ગાંધીનગર  
તા. ૧૮-૧-૨૦૦૮

### પરિપત્ર

માર્ગ અને મકાન વિભાગમાં હાલ રૂા. ૫૦ લાખથી વધુ રકમના ટેન્ડરો ઈ-ટેન્ડર પદ્ધતિથી મેળવવામાં આવે છે. પૂર્વતત્તી પદ્ધતિ મુજબ ટેન્ડર ફી તથા અર્નેસ્ટ ડીપોઝીટ વિભાગીય કચેરીએ રુબરુ ચોક્કસ સમયમર્યાદા માં મેળવ્યા બાદ એજન્સીના ટેન્ડર ખોલવામાં આવે છે. આ પદ્ધતિમાં મળેલ ફરીયાદ ધ્યાનમાં લેતા ઈ ટેન્ડર પદ્ધતિમાં નીચે મુજબ ફેરફાર કરવા નિર્ણય લેવામાં આવે છે. આ શરતનો સમાવેશ દરેક ટેન્ડર નોટીસ - ટેન્ડરનાં મુસદ્દામાં કરવાનો રહેશે.

Demand Draft for E.M.D. & Tender fee shall be submitted in electronic format only through online (by scanning) while uploading the bid. This submission shall mean that E.M.D. & tender fee are received for purpose of opening the bid. Accordingly offer of those shall be opened whose E.M.D. & tender fee is received electronically. However for the purpose of realization of D.D. bidder shall send the D.D. in original through R.P.A.D. so as to reach to Executive Engineer Division ..... within 7 days from the last date of uploading penaltative action for not submitting D.D. in Original to E.E. by bidder shall be initiated. D.D. for Exemption Certificate is not necessary. However Exemption Certificate shall have to be submitted Electronically through online.

Any documents in supporting of tender bid shall be submitted in electronic format only through online (by scanning etc) & hard copy will not accepted separately.

ટેન્ડર માટે બાનાની રકમ (ઈ.એમ.ડી.)તથા ટેન્ડર ફી ના ડીમાન્ડ ડ્રાફ્ટ ઓન લાઈન સ્કેન કરી ઈલેક્ટ્રોનિક ફોરમેટમાં ટેન્ડર અપલોડ કરવાનો રહેશે. આ પ્રકારે જુ થયેલ વિગતે બાનાની રકમ અને ટેન્ડર ફી મળેલ ગણવાની રહેશે અને તદઅનુસાર ટેન્ડર ખોવામાં આવશે તે અનુસાર ઈલેક્ટ્રોનિક ફોરમેટમાં બાનાની રકમ અને ટેન્ડર ફી મળેલ હોય તેની જ ઓફર ખોલવામા આવશે. ખરેખર ચુકવણા માટે ટેન્ડર ભરનારે ડીમાન્ડ ડ્રાફ્ટ અસલમાં રજીસ્ટર્ડ પોસ્ટ એ.ડી. ને કાર્યપાલક ઈજનેરશ્રી, .....વિભાગ ..... ને અપલોડીંગની છેલ્લી તારીખથી દિન-૭ માં મળે તે અનુસાર રજુ કરવાના રહેશે. અસલમાં ડીમાન્ડ ડ્રાફ્ટ નહી મોકલનાર સામે શિક્ષાત્મક પગલા શરુ કરવામાં આવશે. બાના મુકિત માટે ડીમાન્ડ ડ્રાફ્ટ જરુરી બનશે નહી. પરંતુ મુકિતના પ્રમાણપત્ર ઈલેક્ટ્રોનિક ઓન લાઈન રજુ કરવાનું રહેશે.

ટેન્ડર બીડના માટે જરુરી આધાર માટેના કોઈ પણ ડોક્યુમેન્ટ ઓન લાઈન ઈલેક્ટ્રોનિક ફોરમેટમાં સ્કેન કરી મોકલવાના રહેશે. અને હાર્ડ કોપી અલાયદી રીતે સ્વીકારવામાં આવશે નહી.

ગુજરાત રાજ્યપાલશ્રીના હુકમથી અને તેમના નામે,

ઉપસચિવ  
માર્ગ અને મકાન વિભાગ

પ્રતિ

સર્વ અધિક્ષક ઈજનેરશ્રીઓ

રાજ્ય વિભાગ - પંચાયત મા.મ. વર્તુળ- ને.હા. વર્તુળ- પા.યો.વર્તુળ

રા.મા.યો. વર્તુળ ગાંધીનગર સહીત

સર્વ શાખાઓ મા.મ. વિભાગ સચિવાલય ગાંધીનગર

કોન્ટ્રાક્ટર ધ્વારા પુરો પાડવામાં આવતા ડામર ના ભાવ તફાવત બાબત

ગુજરાત સરકાર  
માર્ગ અને મકાન વિભાગ  
પરિપત્રક્રમાંક એસટીઆર ૧૦૨૦૦૧ મં. ૩૪ - ૨૯ હ  
૧૪લ સરદાર ભવન, સચિવાલય ગાંધીનગર  
તા.૨/૨/૨૦૦૭

અનુસંધાન

(૧) આવિભાગના (૧)પરિપત્ર ક્રમાંક એસટીઆર ૧૦૯૭-૮૨- હ તા. ૨૭/૧૧/૯૭

(૨) પરિપત્રક્રમાંક એસટીઆર ૧૦૯૭ મં. ૮૨- હ તા. ૨૧/૧૧/૯૮

(૩) પરિપત્ર ક્રમાંક એસટીઆર-૧૦-૨૦૦૧-મં.-૩૪-૨૯-હ તા. ૪/૧૦૨૦૦૫

પરિપત્ર

માર્ગ અને મકાન વિભાગ ધ્વારા હાથ ધરવામાં આવતા કામોમાં સીમેન્ટ સ્ટીલ હને ડામર ઈજારદાર ધ્વારા પુરા પાડવામા આવે છે. જેમાં ઈજારદારને ભાવ તફાવત ચુકવવા/ વસુ કરવાની જોગવાઈ છે.

સીમેન્ટ અને સ્ટીલના ભાવ તફાવત ચુકવવા/વસુલ કરવાની જોગવાઈ કામ શરુ કર્યાથી પુરુ કરવાની મુળ સમય મર્યાદા અને વધારેલી સમય મર્યાદા સુધી લાગુ પડે છે. જ્યારે ડામરના કિસ્સામાં કામ પુરુ કરવાની વધારેલ સમય મર્યાદામાં ભાવ તફાવતની રકમ આપવા અંગે વિસંગતતા હોઈ ગુજરાત કોન્ટ્રાક્ટર્સ એસોસીયેશન અમદાવાદની રજુઆત થયેલ છે. જે ધ્યાને લઈ પુખ્ત વિચારણાના અંતે ઉપરોક્ત અનુસંધાન ૨ માં દર્શાવેલ તા.૨૧/૧૧/૯૮ ના પરિપત્રની સુચના ક્રમાંક ૨ રદ ગણી તેની જગ્યાએ નીચે મુજબ સુધારો કરવામાં આવે.

૨ રીઝર્વ બેન્કના બુલેટીનમાં ડામરના કોઈ ઈન્ડેક્સ ન હોવાથી ઈજારદાર વર્ક ઓર્ડર આપ્યા બાદ જે ડામર ખરીદે તેના રીફાઈનરીના અસલ બીલો રજુ કરે અને ખરીદેલ ડામરનો જથ્થો વર્ક ઓર્ડર મુજબના કામમાં ટેન્ડર મુજબની મુળ સમય મર્યાદા અને સરકારી કારણોના લીધે વધારેલી સમય મર્યાદા દરમ્યાન વાપરે તેના બીલના ખરીદ ભાવ અને ટેન્ડરમાં દર્શાવેલ સ્ટાર રેટ વચ્ચેના તફાવતની રકમનું ચુકવણું / વસુલાત (રીકવરી) કરવાની રહેશે.

જે કિસ્સામાં કામ પુર્ણ કરવામાં ઈજારદારના કારણોના લીધે જે વિલબ થયેલ હોય તે સમય ગાળાની સમય મર્યાદા વધારવામાં આવે તે દરમયાનનો ભાવ તફાવત મળવા પાત્ર થશે.

કામની મુદત વધારવા અંગેની દરખાસ્તમાં પુરતી ચકાસણી કરી વિલંબના કારણો ખાતાની ભુલના કારણે કે ઈજારદારની ભુલના કારણે હોય તે અલગ દર્શાવવાના રહેશે.

આમ સીમેન્ટ અને સ્ટીલના ભાવફેર આપવાની જે જોગવાઈ છે તે મુજબ ન ડામર માટે પણ ઉપર જણાવ્યા અનુસાર મુળ સમય મર્યાદા અને વધારેલ સમય મર્યાદામાં ભાવ તફાવત ચુકવણું /વસુલાત (રીકવરી) કામના ચુકવણાના ચાલુ બીલોમાં કરવાની રહેશે.

અનુસંધાનમાં દર્શાવેલ પરિપત્રોઅન્યુ સુચનાઓ યથાવત રહેશે. આ સુધારો વિભાગના નાણાંકીય સલાહકાર શ્રીની તા.૨૨/૧/૨૦૦૭ ની નોંધથી મળેલ સંમતિ અને બહાર પાડવામાં આવે છે. આ પરિપત્રનો અમલ પરિપત્રની તારીખથી નવા ડ્રાફ્ટ ટેન્ડરમાં કરવાના રહેશે.

ગુજરાત રાજ્ય પાલશ્રીના હુકમથી અને તેમના નામે.

સહી/-

(પી.બી. શાહ)

ઉપસચિવશ્રી (યં અને મ)

માર્ગ અને મકાન વિભાગ

તિ,

સર્વે અધિક્ષક ઈજનેરશ્રીઓ

માર્ગ અને મકાન વિભાગ હેઠળના તમામ (પંચાયત મા.મ. વર્તુળ/રા.ધો.મા./રા. રસ્તા વર્તુળ)

નકલ રવાના :-

(૧) સર્વે કાર્યપાલક ઈજનેરશ્રીઓ (પંચાયત મા.મ. વિભાગ સહિત)

(૨) વિભાગના દરેક તાંત્રિક અધિકારીઓ

(૩) વિભાગની દરેક તાંત્રિક શાખાઓ

(૪) નાણા શાખા મા.મ. વિભાગ સચિવાલય ગાંધીનગર  
(૫) સિલેક્ટ ફાઈલ ૨૦૦૭  
(૬) ના.સ.અ.શ્રી સિલેક્ટ ફાઈલ ૨૦૦૭  
(૭) ગુજરાત કોન્ટ્રાક્ટર્સ એસોસીયેશન અમદાવાદ

ગુજરાત સરકાર  
ઉદ્યોગ અને ખાણવિભાગ  
ઠરાવ ક્રમાંક: એમએમઆર/૧૧૨૦૦૦/૨૦૧૩/છ.  
સચિવાલય, ગાંધીનગર  
તારીખ : ૧/૮/૨૦૦૪

વંચાણે લીધા ::-

- (૧) ઉદ્યોગ , ખાણ અને ઉર્જા વિભાગનો ઠરાવ ક્રમાંક: એમસીઆર-૨૧૬૮-૭૩૮૦-છ. તા.૧૨/૧૨/૧૯૬૮
- (૨) ઉદ્યોગ, ખાણ અને ઉર્જા વિભાગનો ઠરાવ ક્રમાંક: એમસીઆર-૨૧૬૮-૮-૬૬૮૫-છ, તા. ૧/૧/૧૯૮૭
- (૩) ઉદ્યોગ, ખાણ અને ઉર્જા વિભાગનો ઠરાવ ક્રમાંક: એમસીઆર-૨૧૮૮-(૮)૬૫-છ તા.૨૫/૧/૧૯૮૧
- (૪) ઉદ્યોગ અને ખાણ વિભાગનો ઠરાવ ક્રમાંક: એમસીઆર-૧૦૮૭-૨૮૫૬-છ. તા. ૬/૧૧/૧૯૮૭
- (૫) માન.મુખ્યમંત્રીશ્રીના અધ્યક્ષપણા હેઠળ યોજાયેલ એમ્પાવર્ડ કમીટીની તા. ૧૮/૬/૨૦૦૪ ની બેઠકની કાર્યવાહીનોંધ

ઠ રા વ :-

ઉદ્યોગ, ખાણ અને ઉર્જા વિભાગના સંદર્ભ-(૩) હેઠળના ઠરાવથી એવી જોગવાઈ કરવામાં આવેલ કે રાજ્ય સરકારના, પંચાયતોના અને સરદાર સરોવર નર્મદા નિગમના બાંધવામાં આવતાં રસ્તાઓનાં કે સિંચાઈ વગેરેના કામો માટે જ્યારે સાદી માટી (ઓર્ડીનરી કલે-અર્થ) અને (સોફ્ટ) મુરમ વાપરવામાં આવે ત્યારે ગુજરાત ગૌણ ખનિજ નિયમ, ૧૯૬૬ મુજબ રોયલ્ટી લેવાના નિયમો લાગુ પડશે નહીં. એટલે કે આ કામો માટે કોન્ટ્રાક્ટરો પાસે સાદી માટી (ઓર્ડીનરી કલે-અર્થ) અને (સોફ્ટ) મુરમ માટે રોયલ્ટી લેવાની થશે નહીં તથા સંદર્ભ-(૪) હેઠળના વિભાગના તા.૬/૧૧/૮૭ ના ઠરાવથી ગુજરાત વિદ્યુતબોર્ડ ધ્વારા હાથ ધરવામાં આવતાં કામો માટે પણ ઉપર મુજબ રોયલ્ટી મુકિતનો લાભ આપવામાં આવેલ. ઉપર્યુક્ત જોગવાઈના કારણે રાજ્યમાં ગેરકાયદેસર રીતે આ ખનિજોનો વપરાશ થતો હોવાનું.

જણાયેલ છે. જેના પરિણામે રાજ્ય સરકારે રોયલ્ટીની આવક ગુમાવવી પડે છે માટે ઉપરોક્ત હુકમોની જોગવાઈની સમીક્ષા કરી તે દૂર કરવાની બાબત સરકારશ્રીની વિચારણા હેઠળ હતી. તા. ૧૮/૬/૨૦૦૪ ના રોજ માન.મુખ્યમંત્રીશ્રીના અધ્યક્ષપણા હેઠળ યોજાયેલ એમ્પાવર્ડ કમીટીની બેઠકમાં નક્કી થયા મુજબ સંદર્ભ-૩ તથા સંદર્ભ-૪ હેઠળના વિભાગના તા. ૨૫/૧/૮૧ તથા તા. ૬/૧૧/૮૭ ના ઠરાવો આથી રદ કરવામાં આવે છે.

ગુજરાતના રાજ્યપાલશ્રીના હુકમથી અને તેમના નામે .

સહી/-  
(આર. બી. વ્યાસ)  
નાયબ સચિવઉધોગ અને ખાણ વિભાગ

ગુજરાત સરકાર  
માર્ગ અને મકાન વિભાગ  
પરિપત્ર ક્રમાંક: ટીએનસી-૧૦-૨૦૦૨-(૧૪)-સ.  
સચિવાલય, ગાંધીનગર  
તારીખ : ૨૭/૪/૨૦૦૫

વિષય :- રાજ્ય સરકારના બાંધકામ માટે વપરાતા ગૌણ ખનિજની રોયલ્ટી ભરવા બાબત.  
સંદર્ભ : ઉધોગ અને ખાણ વિભાગનો ઠરાવ ક્રમાંક: એમએમઆર-૧૧-૨૦૦૦-૨૦૧૩-છ.  
તા. ૧/૮/૨૦૦૪

પ રિ પ ત્ર :-

ઉધોગ, ખાણ અને ઉર્જા વિભાગના તા. ૨૫/૧/૮૧ ના ઠરાવ ક્રમાંક: એમસીઆર-૨૧૮૮-(૮)-૬૫-છ અન્વયે રાજ્ય સરકારના, પંચાયતના અને સરદાર સરોવર નર્મદા નિગમના બાંધવામાં આવતાં રસ્તાઓના કે સિંચાઈ વગેરેના કામો માટે જ્યારે સાદી માટી (ઓર્ડીનરી કલે-અર્થ) અને (સોફ્ટ)મુરમ વાપરવામાં આવે ત્યારે ગુજરાત ગૌણ ખનિજ નિયમ-૧૯૬૬ મુજબ રોયલ્ટી લેવાનો નિયમ લાગુ પડશે નહીં. એટલે કે આ કામો માટે કોન્ટ્રાક્ટરો પાસે સાદી માટી (ઓર્ડીનરી કલે-અર્થ) અને (સોફ્ટ) મુરમ માટે રોયલ્ટી લેવાની થશે નહીં તેવી જોગવાઈ કરવામાં આવેલ છે. હવે ઉપર સંદર્ભમાં દર્શાવેલ ઉધોગ અને ખાણ વિભાગના તા.૧/૮/૨૦૦૪ ના ઠરાવથી તા.૨૫/૧/૮૧ ના ઠરાવ રદ કરવામાં આવેલ છે.

આથી હવે બી-૧ ટેન્ડર ફોર્મ માં ખંડ-૩૬ અને બી-૨ ટેન્ડર ફોર્મમાં ખંડ-૩૫ માં નીચે મુજબ સુધારો કરવામાં આવે છે. રાજ્ય સરકારના બાંધકામ માટે વપરાતા ગૌણ ખનિજની રોયલ્ટી બાબત.

(૧)તા. ૧-૩-૮૧ ના ઠરાવ મુજબ . . . . . મુરમ સિવાયના

અન્ય સુધીના શબ્દો રદ કરી ફક્ત નીચે મુજબ જોગવાઈ અમલમાં રહેશે.

ગૌણ ખનિજ બાબતમાં રા. ગૌ. ખ. નિ. ૧૯૬૬ અને તેના અનુસંધાનમાં વખતોવખત બહાર પાડવામાં આવેલ ઠરાવો લાગુ પડશે, અને તે મુજબ લીઝ કે પરમીટ લેવાનું અને રોયલ્ટી ભરવાની રહેશે(ઉધોગ અને ખાણ વિભાગ ઠરાવ ક્રમાંક: એમએમઆર-૧૧-૨૦૦૦-૨૦૧૩-છ તા. ૧/૮/૦૪)

(અશોક પંડ્યા)  
ઉપસચિવશ્રી

## માર્ગ અને મકાન વિભાગ

પ્રતિ,

સર્વે અધિક્ષક ઇજનેરશ્રી,

(મા.મ.વર્તુળો, પંચાયત (મા.મ)વર્તુળો/એક્સપ્રેસ વે વર્તુળ/રાજ્ય માર્ગ યોજના વર્તુળ

રાષ્ટ્રીય ધોરી માર્ગ વર્તુળો/પાટનગર યોજના વર્તુળ સહિત/

સર્વે કાર્યપાલક ઇજનેરશ્રીઓ(ઉપરોક્ત વર્તુળો હેઠળના તમામ વિભાગો સહિત)

નકલ રવાના :-

-- ઉદ્યોગ અને ખાણ વિભાગ, સચિવાલય ગાંધીનગર

-- નર્મદા, જળસંપત્તિ, પાણી પુરવઠા અને કલ્પસર વિભાગ, સચિવાલય, ગાંધીનગર

-- નિયામકશ્રી, ઇજનેરી સંશોધન સંસ્થા, વડોદરા -- નિયામકશ્રી, એન્જનીયરીંગ સ્ટાફ કોલેજ, ગાંધીનગર

-- મેનેજીંગ ડીરેક્ટરશ્રી, ગુજરાત રાજ્ય બાંધકામ નિગમ લી., ગાંધીનગર --મેનેજીંગ ડીરેક્ટરશ્રી, ગુજરાત રાજ્ય માર્ગ વિકાસ નિગમ લી., ગાંધીનગર--સર્વે તાંત્રિક અધિકારીશ્રીઓ(ના.કા.ઈ. સહિત) મા.મ.વિભાગ, સચિવાલય

--સર્વે પ્રોજેક્ટ શાખાઓ, મા.મ.વિ.સચિવાલય, --સીલેક્ટ ફાઈલ.

રાજ્ય સરકારના બાંધકામ માટે વપરાતા ગૌણ ખનિજની રોયલ્ટી ભરવા બાબત.

ગુજરાત સરકાર

ઉદ્યોગ અને ખાણ વિભાગ

ઠરાવ ક્રમાંક : એમએમઆર/૧૧૨૦૦૦/૨૦૧૩/છ

સચિવાલય, ગાંધીનગર

તારીખ : 1-SEP-2004

વંચાણે લીધા :-

(૧)ઉદ્યોગ, ખાણ અને ઉર્જા વિભાગનો ઠરાવ ક્રમાંક:એમસીઆર-૨૧૬૮-૭૩ ૮૦-છ તા. ૧૨/૧૨/૧૯૬૯.

(૨)ઉદ્યોગ, ખાણ અને ઉર્જા વિભાગનો ઠરાવ ક્રમાંક:એમસીઆર-૨૧૬૮-૮- ૬૬૮૫-છ, તા. ૧/૧/૧૯૮૭

(૩) ઉદ્યોગ, ખાણ અને ઉર્જા વિભાગનો ઠરાવ ક્રમાંક:એમસીઆર-૨૧૮૮-(૮)૬૫-છ તા. ૨૫/૧/૧૯૯૧.

(૪) ઉદ્યોગ અને ખાણ વિભાગનો ઠરાવ ક્રમાંક:એમસીઆર-૧૦૯૭-૨૮૫૬-છ, તા. ૬/૧૧/૧૯૯૭.

(૫) માન. મુખ્યમંત્રીશ્રીના અધ્યક્ષપણા હેઠળ યોજાયેલ એમ્પાવર્ડ કમીટીની તા. ૧૮/૬/૨૦૦૪ ની બેઠકની કાર્યવાહી નોંધ.

ઠ રા વ :-ઉદ્યોગ, ખાણ અને ઉર્જા વિભાગના સંદર્ભ-(૩) હેઠળના ઠરાવથી એવી જોગવાઈ કરવામાં આવેલ કે રાજ્ય સરકારના, પંચાયતોના અને સરદાર સરોવર નર્મદા નિગમના બાંધવામાં આવતાં રસ્તાઓનાં કે સિંચાઈ વગેરેના કામો માટે જ્યારે સાદી માટ્ટ (ઓર્ડીનરી કલે-અર્થ) અને (સોફ્ટ) મુરમ વાપરવામાં આવે ત્યારે ગુજરાત ગૌણ ખનિજ નિયમ, ૧૯૬૬ મુજબ રોયલ્ટી લેવાના નિયમો લાગુ પડશે નહીં. એટલે કે આ કામો માટે કોન્ટ્રાક્ટરો પાસે સાદી માટી (ઓર્ડીનરી કલે-અર્થ) અને (સોફ્ટ) મુરમ માટે રોટલ્ટી લેવાની થશે નહીં તથા સંદર્ભ-(૪) હેઠળના વિભાગના તા. ૬/૧૧/૯૭ ના ઠરાવથી ગુજરાત વિદ્યુતબોર્ડ ધ્વારા હાથ ધરવામાં આવતાં કામો માટે પણ ઉપર મુજબ રોટલ્ટી મુકિતનો લાભ આપવામાં

આવેલ. ઉપર્યુકત જોગવાઈના કારણે રાજ્યમાં ગેરકાયદેસર રીતે આ ખનિજોનો વપરાશ થતો હોવાનું જણાયેલ છે. જેના પરિણામે રાજ્ય સરકારે રોટલ્ટીની આવક ગુમાવવી પડે છે માટે ઉપરોક્ત હુકમોની જોગવાઈની સમીક્ષા કરી તે દૂર કરવાની બાબત સરકારશ્રીની વિચારણા હેઠળ હતી. તા. ૧૮/૬/૨૦૦૪ ના રોજ માન. મુખ્યમંત્રીશ્રીના અધ્યક્ષપણા હેઠળ યોજાયેલ એમ્પાવર્ડ કમીટીની બેઠકમાં નક્કી થયા મુજબ સંદર્ભ-૩ તથા સંદર્ભ-૪ હેઠળના વિભાગના તા. ૨૫/૧/૯૧ તથા તા. ૬/૧૧/૯૭ ના ઠરાવો આથી રદ કરવામાં આવે છે.ગુજરાતના રાજ્યપાલશ્રીના હુકમથી અને તેમના નામે.

સહી/-

(આર. બી. વ્યાસ)

નાયબ સચિવઉદ્યોગ અને ખાણ વિભાગ

ગુજરાત સરકારમાર્ગ અને મકાન વિભાગપીશ્રપત્ર ક્રમાંક:ટીએનસી/૧૦૮૯-(૪)-સસચિવાલય,  
ગાંધીનગર તારીખ : ૨૧.૧૦.૨૦૦૫

પરિપત્ર:-

વિષય: કોન્ટ્રાક્ટરો ને સરકારી કામના ટેન્ડરોમાં શેડ્યુલ-એ હેઠળ સરકારી વિભાગો દ્વારા સિમેન્ટ તથા લોખંડ

પુરાપાડવાની પ્રથા રદ કરવાને કારણે પ્રાઇસ એસ્કેલેશનના હુકમોમાં સંબંધિત સુધારો કરવા બાબત (ક્લોઝ ૫૯-૫૯-એ-(બી-૨)અને ક્લોઝ ૬૦-૬૦એ(બી-૧)

સંદર્ભ: (૧) સરકારી ઠરાવક્રમાંક:સીસીએ-૧૫૭૪-સી-૧૭૪૧-(૩૬)-સ,તા:૩૧-૮-૮૧

(૨) સરકારી ઠરાવક્રમાંક:સીસીએ-૧૫૭૪-સી-૧૭૪૧-(૩૬)-સ,તા:૭-૪-૮૩

(૩) સરકારી ઠરાવક્રમાંક:ટીએનસી-૧૦૮૮- (૪)-સ,તા:૩૧-૮-૮૧

(૪) સરકારી ઠરાવક્રમાંક:ટીએનસી-૧૦૮૮- (૪)-સ,તા:૫-૧૦-૯૧

(૫) સરકારી ઠરાવક્રમાંક:ટીએનસી-૧૦૮૮- (૪)-સ,તા:૭-૪-

(૬) સરકારી ઠરાવક્રમાંક:ટીએનસી-૧૦૮૮-આઇબી-૨૨૦- (૧૮)-સ,તા:૩૧-૩-૦૫

સરકારશ્રીના ઉપર સંદર્ભ(૩) માં દર્શાવેલ તા.૩૧-૮-૮૧ના ઠરાવથી ટેન્ડર ફોર્મના ક્લોઝ ૫૯-૫૯-એ-(બી-૨)અને ક્લોઝ ૬૦-૬૦એ(બી-૧) માં સુધારો કરવામાં આવેલ. ઉપર સંદર્ભ(૬)મા દર્શાવેલ તા:૩૧-૩-૦૫ ના પરિપત્રથી સરકારી કામ ના ટેન્ડરોમાં શેડ્યુલ-એ હેઠળ સરકારી વિભાગો દ્વારા કોન્ટ્રાક્ટરો ને સિમેન્ટ તથા લોખંડ પુરા પાડવાની જોગવાઈ રદ કરવામાં આવેલ છે. ઉપરોક્ત સંદર્ભ(૩) માં દર્શાવેલ તા.૩૧-૮-૮૧ના ઠરાવથી કરેલ ફેરફાર ફક્ત રૂ.૧૫.૦૦ લાખ થી વધુ રકમન કામો માટે હતા.પ્રસ્તુત બાબતમા પુખ્ત વિચારણાને અંતે હવે રૂ.૧૫.૦૦ લાખ થી નીચે ની કોઇપણ રકમના કામોમા પણ સ્ટારરેટની જોગવાઈ રાખવાનો નિર્ણય થયેલ છે. આ પરિપત્રનો અમલ તે રવાના થયાની તારીખથી કરવાનો રહેશેઆ હુકમો આ વિભાગના ફાઇઅલ ક્રમાંક ટીએનસી -૧૦૮૮-આઇબી-૨૨૦- (૧૮)-સ, પર સરકારી શ્રીની તા.૧૨-૭-૨૦૦૪ ના રોજ મળેલ સંમતિથી બહાર પાડવામાં આવે છેગુજરાતના રાજ્યપાલશ્રીના હુકમથી અને તેમના નામે, (અશોક

પંડ્યા)ઉપસચિવ માર્ગ અને મકાન વિભાગ

પ્રતિ,નર્મદા જળસંપત્તિ,પાણી પુરવઠા અને કલ્પસર વિભાગ, સચિવાલય, ગાંધીનગરસર્વે અધિક્ષક ઈજનેરશ્રીઓ.(મા.મ.વર્તુળ ,પંચાયત, મા.મ.વર્તુળ,/રા.ધો.મા./રાજ્ય માર્ગ યો.વર્તુળ/ એક્સપ્રેસ વે વર્તુળ / પાટનગર યોજના વર્તુળ સહિત)સર્વે કાર્યપાલક ઈજનેરશ્રીઓ(ઉપરોક્ત વર્તુળ હેઠળના તમામ વિભાગો)સર્વે તાંત્રિક અધિકારીઓ,માર્ગ અને મકાન વિભાગ, સચિવાલય ગાંધીનગર સર્વે પ્રોજેક્ટ શાખાઓ,માર્ગ અને મકાન વિભાગ, સચિવાલય ગાંધીનગર સિલેક્ટ ફાઇલ

ગુજરાત સરકાર માર્ગ અને મકાન વિભાગ પરિપત્રક્રમાંક એસએસઆર-૧૦૨૦૦૪-આઇબી-૪૧(૨૪)-સ  
સચિવાલય ગાંધીનગર તા.૨/૧૨/૨૦૦૬

વિષય : મકાનો અને અન્ય બાંધકામના કામદારો ના કલ્યાણ સેસ.એક્ટ ૧૯૯૬ હેઠળ ૧% સેસ  
“ગુજરાત બિલ્ડીંગ એન્ડ અધર કન્સ્ટ્રક્શન વર્કસ વેલફેર બોર્ડ”માં જમા કરાવવા અંગે.

સંદર્ભ: (૧) શ્રમ અને રોજગાર વિભાગ, સચિવાલય ગાંધીનગર નો ઠરાવ ક્રમાંક : સીડબલ્યુએ-  
૨૦૦૪/૮૪૧-એમ-૩, તા: ૩૦-૦૧-૨૦૦૬

(૨) શ્રમ અને રોજગાર વિભાગ, સચિવાલય ગાંધીનગર નો ઠરાવ ક્રમાંક : સીડબલ્યુએ-  
૨૦૦૪/૧૮૩૧-એમ-૩, તા: ૯-૧૨-૨૦૦૫

પરિપત્ર:

ઉપરોક્ત વિષયના સંદર્ભ માં દર્શાવેલ શ્રમ અને રોજગાર વિભાગ, સચિવાલય ગાંધીનગરના  
તા: ૩૦-૦૧-૨૦૦૬ અને તા: ૯-૧૨-૨૦૦૫ ના ઠરાવો(નકલ સામેલ છે) તરફ સર્વે સંબંધિતોનું ધ્યાન  
દોરતા આથી જણાવવામાં આવે છે કે મંજૂર કરાતા ડ્રાફ્ટ ટેન્ડર પેપર્સમાં “સેસ” અંગે જોગવાઈ કરીને  
ઇજારદારોના દર મહિને કરેલ કામના બિલના ચુકવણીમાંથી ૧(એક) ટકો સેસ કાપીને તે રકમ “ગુજરાત  
બિલ્ડીંગ એન્ડ અધર કન્સ્ટ્રક્શન વર્કસ વેલફેર બોર્ડ”ના સંદર્ભ: (૨) હેઠળ ના ઠરાવથી નિયત કરેલ હેડ-  
સબહેડ ખાતે સંબંધિત કાર્યપાલક ઇજનેરશ્રી દ્વારા જમા કરાવવાની રહેશે. હવે પછીથી જે નવા અંદાજો  
મંજૂર કરવામાં આવે તેવા અંદાજ ની દરેક આઇટમના ભાવોમાં ૧% વધારો કરીને વધારેલ ભાવ મુજબ



અંદાજો મંજૂર કરવાના રહેશે.તથા ડ્રાફ્ટ ટેન્ડર પેપર્સમાં તે મુજબ રકમ મુકવાની રહેશે. મોટા અને સુવાચ્ય અક્ષરે ITB માં બીલ માંથી કપાત થનાર બધાજ પ્રકારના ટેક્સ/સેસ વિગેરેનો ઉઅલ્લેખ કરવાનો રહેશે.આ સુચના નો અમલ ચુસ્તપણે થાય તેની સંબંધિતો એ નોધ લઇ તે મુજબ કાર્યવાહી અચૂક રીતે હાથ ધરવાની રહેશે.

(અશોક પંડ્યા)

ઉપસચિવ

માર્ગ અને મકાન વિભાગ

પ્રતિ,

સર્વે અધિક્ષક ઈજનેરશ્રીઓ.(મા.મ.વર્તુળ/પંચાયત,મા.મ.વર્તુળ,/ને.હા.વર્તુળ./એક્સપ્રેસવેવર્તુળ/રા.મા.યો.વર્તુળ/ પાટનગર યોજના વર્તુળ તથા ઇલેક્ટ્રીકલ મા.મ. એક્સપ્રેસ વે વર્તુળ સહિત)સર્વે કાર્યપાલક ઈજનેરશ્રીઓ(ઉપરોક્ત વર્તુળો હસ્તકના સર્વે વિભાગો)સર્વે તાંત્રિક અધિકારીઓ,ના.કા.ઇ.શ્રીઓ સહીત,માર્ગ અને મકાન વિભાગ, સચિવાલય ગાંધીનગર સર્વે પ્રોજેક્ટ શાખાઓ,માર્ગ અને મકાન વિભાગ, સચિવાલય ગાંધીનગર સિલેક્ટ ફાઇલ-૨૦૦૬ સ-શાખા મા.અને મ. વિભાગ, સચિવાલય ગાંધીનગર

### **Opening of New Sub-head of Account**

Government of Gujarat  
Labour and Employment Department  
No: CWA-2004-1831-M(3)  
Sachivalaya, Gandhinagar  
Dated: 09/12/2005

Read:

(1) Commissioner of Labour(Factory Wing),Ahmedabad,Letter No; CL-DISH-A-LAW-2004-1748,Dated:3-6-2004

(2) Finance Department, Gandhinagar, Letter No: ONS-102005-5435(133)-K Dated :01-12-2005

### RESOLUTION

Under the Gujarat Building and other Construction Worker's (Regulation of Employment and Condition of Service) Rules 2003, the proposal to meet with the expenditure incurred for the various welfare activities for the beneficiaries of Gujarat Building and Other Construction Workers' Welfare Board and payment of salaries to his establishment of the said board, has been received from Commissioner of Labour, vide his letter referred to in the permeable. The said proposal was under active consideration for some time. After careful consideration, the government is pleased to open a New Sub-Head of Account as under:-

- Demand No:- • -
- Major Head:- • 0230-Labour and Employment
- Sub Major Head:- • -
- Minor Head:- • 106-Fees under Contract Labour (Regulation and Abolition) Rules
- Sub Minor Head:- • (03)-Contribution from beneficiaries building workers under Gujarat Building & Other Construction Workers' Welfare Cess Act 1996

- Demand No:- • -
- Major Head:- • 0230-Labour and Employment
- Sub Major Head:- • -
- Minor Head:- • 106-Fees under Contract Labour (Regulation and Abolition) Rules
- Sub Minor Head:- • (04)-Income from cess levied under Gujarat Building & Other Construction Workers' Welfare Cess Act 1996

- Demand No:- • 57
- Major Head:- • 2230-Labour and Employment
- Sub Major Head:- • 01-Labour
- Minor Head:- • 111-Social Security of Labour
- Sub Minor Head:- • (05)-Activities of the Gujarat Building & Other Construction Workers' Welfare Cess Act 1996

2.0 The Competent Authority (Registering Officer or the Appellate Officer as the case may be) shall arrange to deposit the amount in the said head by challan in the respective treasury or in the bank specified by the State Government, accordingly.

3.0 This order is issued in corporate with Finance Department's letter Dated 01-12-2005, referred to in preamble.

By order and in the name of the Governor of Gujarat.

Sd/-  
(S.K. Bamaniya)  
Under Secretary to Govt. of Gujarat,

Labour and Employment  
Department

To:

1. The Principal Secretary and Chairman, Gujarat Building and Other construction Workers' Welfare Board, Sachivalaya, Gandhinagar
2. The Commissioner of Labour, Gujarat State, O-3, New Mental Hospi. Compound, Meghaninagar, Ahmedabad
3. The Director, Industrial Safety & Health, O-9, New Mental Hospi. Compound, Meghaninagar, Ahmedabad
4. The Accountant General, Gujarat, Ahmdabad
5. The Accountant General, Gujarat, Rajkot
6. All District Treasury Officers
7. The Deputy Commissioner of Labour, C/O the Commissioner of Labour, Gujarat State, Meghaninagar, Ahmedabad
8. The Member Secretary, Gujarat Building and Other construction Workers' Welfare Board, C/O Office of the Commissioner of Labour, Gujarat State, Meghaninagar, Ahmedabad-16
9. The Finance Department(K-Branch) sachivalaya, Gandhinagar
10. The Section Officer, M-1 Br. Labour and Employment department, sachivalaya, Gandhinagar
11. The Branch select file
12. The Dy. S.O. select file.

Instruction on implementation of the Building  
and other Construction Workers(ROE & COS)  
Act, 1996  
and Building and Other Construction workers  
Welfare Cess Act, 1996

Government of Gujarat  
Labour and Employment Department  
No: CWA-2004-1831-M(3)

Sachivalaya, Gandhinagar

Dated: 30-Jan-2006

Read: Labour & Employment Department, Gandhinagar GR No: CWA-2004-1831-M(3) dated 9-12-2005

## **RESOLUTION**

Building and other constructions workers are one of the largest and most vulnerable segments of unorganized labour. Their work is characterized byb inherent risk to life and limb of the workers and also by casual nature, temporary relationship between employer and employee, uncertain working hours, lack of basic amenities and inadequate welfare facilities.

Government of India has decided to constitute Welfare Boards for such workers in every state and accordingly, the Building and other Construction workers (Regulation of Employment & Conditions of Service) Act 1996 was enacted by Parliament and brought into force from 19<sup>th</sup> August, 1996. Implementation of the Act including cess collection has already commenced in Kerala, Karnataka, Tamil Nadu and Delhi. Under the said Act, Government of Gujarat has constituted a Board under section 18. The State Government has been given powers to make rules for carrying out the provisions of this Act.

Accordingly, Government of Gujarat made Gujarat Building and other Construction Workers (Regulation of Employment and Condition of Service) Rules, 2003 and published these Rules vide Notification No: GHR 2003- CWA-2000-1869-M(3), dated 18<sup>th</sup> August 2003. Government of Gujarat has also constituted the Gujarat building and other Construction Workers welfare Board vide Notification No: GHR/2004/163/ CWA /2004 /3743-M3, dated 18<sup>th</sup> December 2004. Secretary (labour) has been appointed as Chairman.

Government of India has also enacted the Building and other Construction Workers Welfare Cess Act (hereinafter called as Cess Act) and brought it in force from 19<sup>th</sup> August 1996. The Cess Act Provides for the levy and collection of cess on the cost of construction incurred by the employers, for increasing the resources of the Welfare Board. Section 3 of the Cess Act provides that Cess shall be levied and collected at a rate not less than 1% of the cost of Construction incurred by an employer. Rule 5 of the Building and Other Construction Workers' Welfare Cess Rules, 1998 reads as follows: The proceeds of the cess collected under Rule 4 shall be transferred by such Government Office, Public Sector Undertakings, Local authority or cess collector, to the Board along with the form of challan prescribed (and in the head of account of the Board) under the accounting procedures of the state, by whatever name they are known.

Such Government Office or Public Sector Undertaking may deduct from the cess collected or claim from the Board, as the case may be, actual collection expenses not exceeding one Percent of the total amount collected.

The amount collected shall be transferred to the Board within thirty days of its collection.

Moreover under Rule 6 every employer within thirty days of commencement of his work or payment of cess, as the case may be has to furnish information in Form 1 to the Assessing Officer. Under Rule 12, the Assessing Officer in cases where the employer has not pay the cess or has paid less cess, can impose a penalty upto the amount of cess payable.

By Government of Gujarat Notification No: GHR/2005/04/CWA/2004/841/M3 dated 3<sup>rd</sup> January 2005, all Heads of Departments of the Government of Gujarat, all Executive Heads of Public Sector Undertakings and all Executive Heads of Local Authority (except Gram panchayat and Nagar Panchayat) are declared as Cess Collectors and Assessing Officer.

The Building and other Construction workers Welfare Board has passed the necessary resolution to collect the cess with effect from 13<sup>th</sup> December 2004.

Accordingly the cess is payable by Government Officers, Public Sector Undertakings and Local Authority or Cess Collector to the Board in Challan prescribed in the following Head/Sub Head:

- Major Head:- • 0230-Labour and Employment
- Minor Head:- • 106-Fees under Contract Labour(Regulation and Abolition) Rules
- Sub Minor Head:- • (04)-Income from cess levied under Gujarat Building & Other Construction Workers' Welfare Cess Act 1996

Approval of the Finance Department, Government of Gujarat has been taken for meeting the expenditure to be incurred for the various welfare activities by the Gujarat Building and Other Construction Workers Welfare Board and the opening of the Accounting Head/SubHead in file No: CWA – 2004-1831-M3 on 1<sup>st</sup> December 2005(Copy of Resolution dated 9/12/2005 is enclosed)

All Government Departments Public Sector Undertakings and Local Authority are instructed to pay the above cess as per the Act. All departments, Public Sector Undertakings and Local Authority are also advised to incorporate the 1% Cess in their estimates for all new works.  
By order and in the name of the Governor of Gujarat.

Sd/-

(Vinod Babbar)

Principal Secretary to Government,  
Labour and Employment Department

Principal Secretary to Chief Minister, Sachivalaya, Gandhinagar

Ps to all Ministers

Ps to all Minister of state

PS to Chief secretary

Accountant General, Gujarat, Rajkot/Ahmedabad All Department of sachivalaya with a request to circulate to all HODS/Boards/Corporations under their administrative control

Pay & Account Office, Ahmedabad/Gandhinagar Resident Audit Office.

Ahmedabad/Gandhinagar

All heads of Departments under Local & Employment Department

All District Panchayat

All Municipal Corporations

Branch Select File

Dy.S.O. Select File

ઈ ટેન્ડરીંગમાં ટેન્ડર ફી અને અન્ય ડોક્યુમેન્ટ રજુ કરવા અંગે.

ગુજરાત સરકાર

માગ અને મકાન વિભાગ

પરિપત્ર ક્રમાંક પરચ-૧૦૨૦૦૮-૫-સ

સચિવાલય ગાંધીનગર

તા. ૨૭-૧૧-૨૦૦૮

પરિપત્ર

માર્ગ અને મકાન વિભાગમાં હાલ માં ટેન્ડરો ઈ-ટેન્ડર પદ્ધતિથી મેળવવામાં આવે છે. તે અન્વયે સમાન ક્રમાંકના તા.૧૮/૧/૦૮ ના પરિપત્ર માં ટેન્ડર ફી અને બાનાની રકમ જે તે કાર્યપાલક ઇજનેરશ્રી ને ખરેખર ચુકવવા માટે દિન-૭ મં અસલમાં રજીસ્ટર્ડ પોસ્ટ એ.ડી થી મોકલવાની તેમજ અસલમાં ડીમાન્ડ ડ્રાફ્ટ નહિ મોકલનાર સામે શિક્ષાત્મક પગલા લેવાની જોગવાઈ હતી. ઉપરોક્ત પરિપત્રમાં નીચે મુજબ અંશ:ત સુધારો કરી આ શરત નો સમાવેશ ટેન્ડર નોટીસ/ ટેન્ડર મુસદ્દામાં Through R.P.A.D. so as to reach to Executive Engineer Division ..... within 7 days from the last date of uploading ને બદલે " to S.E at the time of tender opening or Send the same through R.P.A.D. so as to reach to Executive Engineer Division ..... within 7 days from the last date of opening." સુધારો કરવામાં આવે છે.તેમજ ખરેખર ટેન્ડર ફી તેમજ બાનાની રકમ નિયત સમયમાં ઇજારદાર ન ભરે તો ઇજારદારની નોંધણી એક વર્ષ માટે એવેન્સ માં રાખવાની કાર્યવાહી કરી ઇ- ટેન્ડરીંગ નો કોડ એક વર્ષ માટે રદ કરાશે.

ગુજરાત રાજ્યપાલશ્રીના હુકમથી અને તેમના નામે,

(આર.કે. ચૌહાણ)

ખાસ ફરજ પર ના અધિકારી

માર્ગ અને મકાન વિભાગ

પ્રતિ

સર્વે મુખ્ય ઇજનેર અન અધિક સચિવશ્રી, માર્ગ અને મકાન વિભાગ સચિવાલય ગાંધીનગર

સર્વે ઉપસચિવશ્રી, માર્ગ અને મકાન વિભાગ સચિવાલય ગાંધીનગર

સર્વ અધિક્ષક ઇજનેરશ્રીઓ ,રાજ્ય વિભાગ - પંચાયત મા.મ. વર્તુળ- ને.હા. વર્તુળ- પા.યો.વર્તુળરા.મા.યો. વર્તુળ ગાંધીનગર સહીત

સર્વ કાર્યપાલક ઇજનેરશ્રીઓ , માર્ગ અને મકાન વર્તુળ - પંચાયત મા.મ. વર્તુળ- ને.હા. વર્તુળ- પા.યો.વર્તુળરા.મા.યો. વર્તુળ ગાંધીનગર સહીત

સર્વ શાખાઓ મા.મ. વિભાગ સચિવાલય ગાંધીનગર

સીલેક્ટ ફાઈલ

ટેન્ડર માં ભરેલ અસામાન્ય ઊંચા ભાવોના સંદર્ભે  
કામ પર પડતા ખર્ચ પર નિયંત્રણ રાખવા તથા  
કામની નાણાકીય પ્રગતિ ભૌતિક પ્રગતિ સાથે  
સુમેળમાં રહે તે માટે જરૂરી જોગવાઈ કરવા બાબત

ગુજરાત સરકાર  
માર્ગ અને મકાન વિભાગ  
પરિપત્ર ક્રમાંક પરચ-૧૦૨૦૦૮-૬૧-સ  
સચિવાલય ગાંધીનગર  
તા. ૨૭-૧૧-૨૦૦૮

પરિપત્ર:

ટેન્ડર માં અસામાન્ય ઊંચા કે નીચા ભાવો ઇજારદારશ્રીઓ દ્વારા ઘણી વાર ભરાતા હોવાનું સરકારશ્રીના ધ્યાન પર આવેલ છે. આવા કિસ્સાઓ માં કામની નાણાકીય અને ભૌતિક પ્રગતિ નો સુમેળ ન રહેવાની સંભાવના રહેલી છે. આથી કામની ભૌતિક પ્રગતિ પ્રમાણે નાણાકીય પ્રગતિ રહે કે જેથી સરકારશ્રી પર સમય પહેલા અયોગ્ય નાણાકીય બોજ ન પડે તે માટે નીચી મુજબની જોગવાઈ ટેન્ડર માં કરવાનો નિર્ણય કરવામાં આવેલ છે. આ જોગવાઈ તમામ કામો ના આ પરિપત્રની તારીખ પછી મંજૂર થતા ડી.ટી.પી માં અચૂક કરવાની રહેશે.

**જોગવાઈ:** જે કોઈ આઈટમનો ભરેલ ભાવ, તે આઈટમ ના ટેન્ડર માં મુકેલ અંદાજભાવ કરતાં ટેન્ડર માં મુકેલ અંદાજ રકમથી સમગ્ર ટેન્ડર જેટલું ઊંચું કે નીચું મંજૂર થયું હોય તે ટકાવારી થી ૧૦% થી વધુ ઉંચો રહેતો હોય તેવી આઈટમનું ચુકવણી રનીંગ બીલ વખતે તે આઈટમના અંદાગજીત ભાવ + / - મંજૂર ટેન્ડરની ટકાવારી + તે આઈટમના અંદાજ ભાવ ના ૫% ની મર્યાદામાં કરવામાં આવશે. આ રીતે વીથહેલ્ડ કરેલ રકમ કામ સંતોષકારક પૂર્ણ થયે ફાઇનલબીલ મંજૂર કરતી વખતે વ્યાજભારણ વગર છૂટી કરવામાં આવશે.

**ઉદાહરણ:**

ઉક્ત જોગવાઈની સ્પષ્ટ સમજણ માટે આ સાથે આપેલ ઉદાહરણ ધ્યાને લેવું.

• ૧ •	ટેન્ડરમાં મુકેલ અંદાજ રકમ	• રૂ. •	૧૦૦/-
• ૨ •	મંજૂર થયેલ ટેન્ડર ની રકમ	• રૂ. •	૧૧૦/-
• ૩ •	ટેન્ડરમાં મુકેલ અંદાજ રકમ સામે ખરેખર મંજૂર થયેલ ટેન્ડર ની ટકાવારી	• •	૧૦%
• ૪ •	ટેન્ડરમાં એક આઈટમનો ટેન્ડર મા મુકેલ અંદાજ ભાવ	• રૂ. •	૧૦/-
• ૫ •	તે આઈટમનો ભરેલ ભાવ	• રૂ. •	૧૪/-
• ૬ •	તે આઈટમનો ભરેલ ઊંચા ભાવની ટકાવારી	• •	૪૦%
• ૭ •	તે આઈટમ માટે રનીંગ બીલ વખતે ચુકવવાપાત્ર ભાવ	• રૂ. •	૧૦ + કોલમ ૩ પ્રમાણે ૧૦% ઉંચા + અંદાજ ભાવના ૫% = રૂ.૧૧.૫૦
• ૮ •	ફાઇનલ બિલ વખતે વ્યાજભારણ વગર ચુકવવાપાત્ર અને વીથહેલ્ડ રાખેલ ભાવ	• રૂ. •	૧૪.૦૦ - ૧૧.૫૦ = રૂ. ૨.૫૦

જો સદર આઈટમના ભાવ રૂ.૧૨.૦૦ કે તેથી નીચા ભરેલ હોય તો રનીંગબીલ માં ભાવ કપાત આ જોગવાઈ મુજબ કરવાની રહેત નહિ.

(આર.કે. ચૌહાણ)

ખાસ ફરજ પર ના અધિકારી

માર્ગ અને મકાન વિભાગ

પ્રતિ: તમામ અધિક્ષક ઇજનેરશ્રીઓ, માર્ગ અને મકાન વિભાગ તમામ કાર્યપાલક ઇજનેરશ્રીઓ , માર્ગ અને મકાન વિભાગ

નકલ રવાના: ૧) સચિવશ્રીના અંગતમદદનીશ,મા.મ.વિભાગ ૨) તમામ મુખ્ય ઇજનેરશ્રી અને અ.સ.શ્રી,મા.મ.વિભાગ

૩) તમામ તાત્ત્વિક ઉપસચિવશ્રીઓ, મા.મ.વિભાગ(૪) ના.કા.ઇ.શ્રીઓ, મા.મ.વિભાગ (પ્રોપરપ) નાણાશાખા , મા.મ.વિભાગ

ક) ના.સિ.અ. સિલેક્ટ ફાઇલ ૭) શાખા સીલેક્ટ



બાંધકામના મટીરીયલ્સ તેમજ કોમ્પોનેન્ટ્સ સેમ્પલની ગુણવત્તા માટેના પરીક્ષણ પૈકીના ૮૦% પરીક્ષણ સ્થળ પર તથા ૧૦% પરીક્ષણ સરકાર માન્ય લેબોરેટરી / ગેરી ધ્વારા તથા ૧૦% ગેરી લેબોરેટરીમાં કરાવવા બાબત.

ગુજરાત સરકાર,  
માર્ગ અને મકાન વિભાગ,  
પરિપત્ર ક્રમાંક:- પરચ/૧૦૨૦૦૭/૨૮/સ  
સચિવાલય, ગાંધીનગર.  
તારીખ: ૩૧/૧૨/૨૦૦૮.

### પરિપત્ર

બાંધકામના મટીરીયલ્સ તેમજ કોમ્પોનેન્ટ્સના સેમ્પલની ગુણવત્તા માટેના પરીક્ષણ હાલ ગેરી કે સરકાર માન્ય સંસ્થા (લેબોરેટરી) મારફતે કરવામાં આવે છે, કામોની પ્રગતિની સમીક્ષા દરમ્યાન ક્ષેત્રીય અધિકારીઓ તરફથી જાણવા મળેલ છે કે ઉક્ત હયાત પ્રક્રિયામાં ટેસ્ટીંગના પરિણામો વિલંબથી મળે છે, જેમાં સમય પણ ખૂબ વ્યતિત થાય છે. ઈજારદાર એસોસિયેશન તરફથી આવી રજુઆતો મળે છે, આથી આ મુશ્કેલી ધ્યાને લેતાં ઈજારદારશ્રી ધ્વારા જે તે કામ માટે સ્થાપવામાં આવતી લેબોરેટરીમાં સ્થળ પર જ પરીક્ષણ કરવામાં આવે તો વિલંબ નિવારી શકાય તે બાબત વિચારણા હેઠળ હતી, પુખ્ત વિચારણાના અંતે નીચે મુજબની નીતિ હાલના તબક્કે અનુસરવા નક્કી કરવામાં આવ્યું છે.

નીચે જણાવેલ પરીક્ષણોમાં પ્રવર્તમાન પદ્ધતિમાં ફેરફાર કરી ફીક્વન્શી અનુસાર જરૂરી પરીક્ષણો પૈકી ૧૦% સરકાર માન્ય લેબોરેટરી/ગેરી તથા ૧૦% ગેરી લેબોરેટરી અને ૮૦% ફીલ્ડ લેબોરેટરી ધ્વારા કરાવવાના રહેશે. પરંતુ ગેરીમાં નીચેના દરેક પૈકી ઓછામાં ઓછું ૧ (એક) પરીક્ષણ ગેરી લેબોરેટરીમાં કરવાનું રહેશે તથા ઓછામાં ઓછું એક પરીક્ષણ ગેરી / સરકાર માન્ય લેબોરેટરીમાં કરાવવાનો રહેશે. જેમાં નીચે દર્શાવેલ પરીક્ષણો સ્થળ પર કરવાના રહે છે.

એ	એગ્રીગેટ	(૧) ગ્રેડેશન (૨) ફ્લેકીનેશ અને ઈલોગેશન વેલ્યુ (૩) ઈમ્પેક્ટ વેલ્યુ (૪) વોટર અબસોર્પશન
બી	માટી	(૧) ફિલ્ડ એફડીડી અને એફએમસી (૨) સીવ એનાલીસીસ

સી	રેતી	(૧) ગ્રેડેશન
ડી	ઈંટો	(૧) ડાયમેનશન અને ટોલરન્સ ટેસ્ટ (૨) વોટર અબસોર્પશન
ઈ	કોંક્રીટ	(૧) નોન ડીસ્ટ્રીક્ટીવ ટેસ્ટ (એલ્ટ્રા સોનીક ટેસ્ટીંગ પદ્ધતિથી ) (૨) સ્લમ્પ ટેસ્ટ (૩) કોમ્પ્રેસીવ સ્ટ્રેન્થ
એફ	બીટ્યુમીનસ મીક્સ	(૧) ડામરની ટકાવારી
જી	ડ્રાય મીક્ષ મટીરીયલ	(૧) ગ્રેડેશન

#### શ રતો :-

૧. ઈજારદારે કામની ગુણવત્તા માટે ધારા ધોરણ પ્રમાણોની અને ઉપર જણાવેલ પરિક્ષણો માટે પ્રમાણિત થયેલ જરૂરી તમામ સાધનો સહિતની ફિલ્ડ ટેસ્ટીંગ લેબોરેટરી સ્વ ખર્ચે કામના સ્થળે યોગ્ય જગ્યા ઉપર સ્થાપવાની રહેશે. રસ્તાના કામ માટે લાગુ પડતા પ્લાન્ટના સ્થળને કામનું સ્થળ ગણી શકાય. પરંતુ કામનું સ્થળ લેબોરેટરીથી દૂર હોય તો ઈજારદારશ્રી ધ્વારા મોબાઈલ લેબોરેટરીની જરૂરી વ્યવસ્થા રાખવાની રહેશે.
૨. કા.ઈ.શ્રી જયારે સ્થળ પર તેઓનું ચેકીંગ કરવા જાય ત્યારે ટેસ્ટીંગ તેઓએ તેમની રૂબરૂમાં પણ કરાવવાનું રહેશે.
૩. ધારા ધોરણ પ્રમાણોના પરીક્ષણોની સંખ્યા પૈકી ૮૦% પરીક્ષણ ફિલ્ડ લેબોરેટરીમાં ઈજારદારના અધિકૃત ક્વોલીફાઈડ ઈજનેર કે જેઓને સંબંધિત કાર્યપાલક ઈજનેરશ્રીએ I-CARD આપેલ હોય તેમના ધ્વારા ખાતાના ના.કા.ઈ./ મ.ઈ./અ.મ.ઈ. ની હાજરીમાં જ કરવાના રહેશે અને પરિક્ષણોમાં સંયુક્ત સહીઓ કરવાની રહેશે જયારે ૧૦% પરિક્ષણ ગેરી/સરકાર માન્ય લેબોરેટરી (ઓછામાં ઓછું એક પરીક્ષણ) અને ૧૦% ગેરી લેબોરેટરી (ઓછામાં ઓછું એક પરીક્ષણ) મારફતે કરાવવાના રહેશે.
૪. કુલ પરિક્ષણોના ૮૦ % પરિક્ષણ એક જ સ્થળે એકજ સમયે એકજ તબક્કામાં નહી કરતાં કામની પ્રગતિ મુજબ જે તબક્કાએ જે તે કામગીરીને અનુરૂપ જે મટીરીયલ્સ વાપરવાનું થતુ હોય તદ્દનુસાર શરૂઆતના તબક્કામાં રાખવું વચ્ચેના તબક્કામાં તેમજ આખરી તબક્કામાં કરાવવાનું રહેશે. આમ છતાં આ બાબતે સ્થાનિક કક્ષાએથી ના.કા.ઈ.શ્રીએ જરૂરીયાત મુજબ તબક્કાવાર પરીક્ષણો નક્કી કરવાના રહેશે.

૮. મુ.ઈ.શ્રી (પીએનપી) માર્ગ અને મકાન વિભાગ, સચિવાલય, ગાંધીનગર.

૯. નાણાંકીય સલાહકારશ્રી (મા.મ.વિ.), નાણાં વિભાગ, સચિવાલય, ગાંધીનગર

૧૦. સર્વે અ.ઈ.શ્રીઓ મા.મ. વર્તુળ, પેટા/મા.મ. વર્તુળ/ને.હા. વર્તુળ/ એક્સપ્રેસ-વે-વર્તુળ/  
પાટનગર યોજના વર્તુળ.

૧૧. સર્વે કા.ઈ.શ્રીઓ ઉપર્યુક્ત વર્તુળો હસ્તકના સર્વે વિભાગો.

૧૨. સર્વે તાંત્રિક અધિકારીશ્રીઓ (ના.કા.ઈ.શ્રીઓ સહિત )

૧૩. સર્વે પ્રોજેક્ટ શાખાઓ (રસ્તાને લગતી ) માર્ગ અને મકાન વિભાગ, સચિવાલય, ગાંધીનગર.

૧૪. સીલેક્ટ ફાઈલ.

૭. નિયામકશ્રી (એસટીસી) સ્ટાફ ટ્રેનીંગ કોલેજ, ગાંધીનગર.

**As per Govt R & B Deptt. Letter No. C.E. (R & B) Office 46/2007 Dated 25/7/2007**

Demand draft for EMD Pre qualification bid & Tender fee shall be submitted in electronic format only through on line (by scanning) while uploading the bid, This submission shall mean that EMD & tender fee is received electronically. However for the purpose of realization of demand draft. bidder shall send the Demand Draft in original through R.P.A.D. so as to reach to Executive Engineer, R & B Division Ahmedabad. During dt.16/01/2025to 21/01/2025. Penaltative action for not submitting Demand Draft in original to EE by bidder shall be initiated Demand Draft for Exemption Certificate is not necessary. However Exemption Certificate shall have to be submitted electronically through online.

Any documents in supporting of bid shall be submitted in electronic format only through online (by scanning etc) & hard copy will not accepted separately.

Sign of Contractor

Executive Engineer  
A'bad (R & B) Division,  
Ahmedabad.

તાત્કાલિક/સમયમર્યાદા:  
ક્રમાંક:પરચ-૨૦૧૦-૧૭૧૩૨૨/(૨૧)ડ.૧

ગુજરાત સરકાર  
માર્ગ અને મકાન વિભાગ  
૧૪/૩, સરદાર ભવન  
સચિવાલય, ગાંધીનગર  
તા. ૧૮/૩/૨૦૧૨

તિ,

અધિક્ષક ઇજનેરશ્રી  
પંચાયત (મા.મ)વર્તુળ-૧,૨  
રાજકોટ/અમદાવાદ

વિષય :- ટેન્ડર ૨૦ ટકા થી વધુ નીચા આવતા ઘટાડાની રકમમાં ૫ ટકા લેખે  
વધારાની સીક્યુરીટી ડીપોઝીટ લેવા અંગે.

ઉપરોક્ત વિષય પરત્વેના તા. ૨/૨/૧૦ ના પત્ર ક્રમાંક:આરપીસી-  
૨/ટેન્ડર/જન/૨૫૮/અન્વયે જણાવવાનું કે, ઉક્ત વિષય સંદર્ભે તા. ૨૧/૧/૧૦ ના રોજની મીટીંગમાં થયેલ  
ચર્ચા મુજબ ઇજારદારશ્રીઓના ટેન્ડરો અંદાજ કિંમતથી ઘણા નીચા આવે છે. ૨૦ ટકા થી વધુ નીચા આવતા  
ટેન્ડરો માટે ઇજારદારશ્રી પાસેથી ટેન્ડરની અંદાજ રકમ સામે સ્વીકૃતિ થતી ટેન્ડરની રકમના તફાવત  
(ઘટાડાની રકમ ઉપર) ના ૫ ટકા વધારાની સીક્યુરીટી ડીપોઝીટ લેવાની દરખાસ્ત ગ્રાહ્ય રાખવામાં આવે  
છે. તદ્ઉપરાંત વર્તમાન સમયમાં ૧૫ ટકા થી વધુના નીચા ટેન્ડરોની પણ ૫ ટકા વધારાની સીક્યુરીટી  
ડીપોઝીટ લેવા જણાવવામાં આવે છે.

સેક્શન અધિકારી  
માર્ગ અને મકાન વિભાગ

Name of Work :- **Const. Of Various Anganwadi Building in Dascroi Taluka Dist. Ahmedabad Package No. AHD/ANGWNADI/12 (2026-2027) (Zanu-1, Gatrad-5, Pardhol-3 ) Total -3**

**SCHEDULE – B**

Memorandum Showing items of Works to be Carried out

Sr. No.	Item of Work	Quantities estimated but may be more or less	Unit	Tender Rates In Figures Rs.P.S.	Total Amount According to Estimated Quantities
1	3	2	6	4	7
1	Item No. 1 Excavation for foundation upto 1.5 m. depth incl. sorting out stacking of seful materials and disposing off the excavated stuff upto 50mt lead.(A) Loose or soft soil	288.000	Cmt	203.83	58703.04
2	Item No. 2 Filling in plinth with sand under floors incl. watering ramming consolidating and dressing etc.comp.	84.000	Cmt	460.19	38655.96
3	Item No. 3 Providing and laying Cement concrete 1:4:8 (1 cement:4 coarse sand:8 Graded Stone Agg. 40 mm nominal Size ) & Quaring etc. complete. Excluding cost of form work in (A)Foundation & Plinth	33.600	Cmt	2800.55	94098.48
4	Item No. 4 Filling available excavated Earth (Excluding Rock) in trench plinth side of foundation etc. in layer not excluding 20 cm in depth consolidation each deposited layer by ramming and watering etc. complete	216.000	Cmt	130.39	28164.24
5	Item No- 5 Brick work using common burnt clay building bricks having crushing strength not less than 35 kg/ sq. C.M. In foundation and plinth in cement mortar 1:6 ( 1cement : 6 fine sand)	39.150	Cmt	4021.02	157422.93
6	Item No- 6 Brick work using common burnt clay building bricks having crushing strength not less than 35 kg/ sq. C.M. In foundation and plinth in cement mortar 1:6 ( 1cement : 6 fine sand) in super structure	68.490	Cmt	4295.99	294232.36
7	Item no- 7 Providing and laying ordinary Cement concrete 1:1.5:3 (1 Cement 1.5 coarse sand 3 graded stone agg. 20 mm nominal size) for RCC lintel including finishing smooth with curing etc. complete includiong the cost of formwork but excluding the cost of reinforcement.	1.230	Cmt	9090.56	11181.39
8	Item no. 8 Providing and laying ordinary cement concrete 1:1.5:3 (1 Cement : 1.5 coarse sand : 3 graded stone aggregates 20mm nominal size) and curing complete Including cost of form work in (i) Beam Having cross-sectional area 0.08 to 0.12 sq. m.	37.200	Cmt	8963.56	333444.43

9	Item No- 9 Provdg & laying Ordinary cement concrete 1:1.5:3 (1cement : 1.5 coarse sand 3 graded stone aggregate 20 mm nominal size) and finishing the smooth with curing etc. complete including the cost of formwok but excluding the cost of reinforcement for RCC work in (II) slabs having more than 10 cm and upto 13 cm thickness.	42.000	Cmt	7257.91	304832.22
10	Item No- 10 Provdg & laying cement concrete 1:1.5:3 (1cement : 1.5 coarse sand :3 graded stone aggregated 20 mm nominal size) and curing complete excluding cost of form work and reinforcement for reinforced concrete work in (A) Foundation, footings, of columns and mass concrete	18.000	Cmt	4332.53	77985.54
11	Item No- 11 Provdg & laying Ordinary cement concrete 1:1.5:3 (1cement : 1.5 coarse sand 3 graded stone aggregate 20 mm nominal size) and finishing the smooth with curing etc. complete including the cost of formwok but excluding the cost of reinforcement for RCC work in (II) COLUMNS (i) Having cross sectional area 0.05 to 0.08 Sq.M.	9.000	Cmt	12151.92	109367.28
12	Item no- 12 Provi. Providing thermo Mechanically treated bars (TMT bars) confirming to IS 1786 / FC 415 for R.C.C. works including, bending, bindign and placing in position complete upto floor 2 level.	7410.000	Kg.	67.26	498396.60
13	Item no- 13 Half brick masonry in common burnt clay building bricks having crushingstrength not less than 35kg/Sq.Cm in cement mortar 1:4 (1 cement ::4 coarse sand) in foundation and plinth (B) Conventional	55.380	Smt	599.84	33219.14
14	Item No. 14 Providing 15 mm thick cement plaser in single coat on brick/ concrete wllas for interiar plastering up to floor two lecel finished even & smooth in (II) cement mortar (l cement : 3 sand) Including finishing with a floating coat of neat cement slurry .	525.000	Smt	176.58	92704.50
15	Item no. 15 Provdg. 10 mm th. Cement plaster in single coat on brick/concrete walls for interior plastering up to floor two level & finished even & smooth in (1) cement mortar 1:3 (1 cement : 3 sand)	252.000	Smt	128.86	32472.72
16	Item No. 16 20 mm thick sand faced cement plaster on walls upto height 10 meters above ground level consisting of 12 mm thick backing coat of C.M.1:3 (1 Cment : 3 sand) and 8 mm thick finishing coat of C.M.1:1 (1 Cement 1 Sand) Watering curing etc. comple.	345.000	Smt	300.66	103727.70

17	Item No- 17 Providing and laying Vitrified tiles 8 to 10 mm thick in skirting risers of steps and dedo on 10 mm thick cement plaster 1:3 (1 Cement 3 coarse sand) and jointed with white cement slurry	10.950	Smt	1141.45	12498.88
18	Item No. 18 Providing and laying 24" x 24" Vitrified 8 mm thick Tile flooring over 20 mm (Avg) base of C.M. 1:6 on new surface or fixing on Extg. Flooring by adhesive material incl. Dismantling of extg. Flooring & jointed with colour cement slurry finished with flush pointing & cleaning the surface etc. complete for antiskit	135.000	Smt	1397.83	188707.05
19	Item No. 19 : Providing & laying broken china mosaic flooring for terrace using 12 mm to 20 mm broken places of glazed tiles to be laid over cement mortar 1:3 in plain or slope and to be tempered to bring mortar cr�me out up to surface using white cement including rounding off junction and extending them up to 15 cm along the well cleaning with water and oxalic acid as directed.	165.000	Smt	747.29	123302.85
20	Item No- 20 Provdlg. & laying white glazed tiles 6 mm th. In flooring, treads of steps & landings laid on a bed of 12 mm th. Cement mortar 1:3 (1cement : 3 coarsesand finished with flush pointing in white cement.	91.500	Smt	917.25	83928.38
21	Item No- 21 Providing and Fixing Door having granite frame flat edge polished with standard extruded coloured anodized aluminum section frame outer size 127mm * 38.1mm * 1.35mm (weight 1.384 Kg/rmt) side hung Double shutter having factory fabricated std.actory made 50 mm thick flush door both side laminated with S.S. Handle size 60 cm long. and SS fixtures & fasnings. as per details colour and pattern approved by architech including necessary stainless steel fixtures and fastenings. etc. complete.	17.400	Smt	6943.75	120821.25
22	Item No. 22 Providingg and fixing extruded aluminium windows having extruded aluminium colour anodized section frame main outer size 95 mm x 24 mm x 1.17 mm (of jindal section No. 2459 @ Wt. 0.738 Kg/ mt) horizontal four trak member size 92 mm x 31.75 mm x 1.30 mm (of jindal section No. 8688@ Wt. 1.07Kg/ mt) vertical member of size 92 mm x 31.75 mm x 1.50 mm (of jindal section No. 8933 @ Wt.1.06 Kg/ mt) with sliding shutters of horizontal member size 40 mm x 18 mm x 1.29 mm (of Jindal Section no. 8947 @ wt. of 0.456 Kg/ mt)	14.400	Smt	1583.95	22808.88



	Vertical member of size 40 mm x 18 mm x 1.29 mm ( of Jindal section No. 8949 @ Wt. of 0.456 Kg/ mt) with 5 mm thick transparent bronze colour tinted float glass with powder coated aluminium silicon sealant glass fixing to frame as per details etc. complete.				
23	Item No. 23 Providing and Fixing Machine cut, free edges, pre mirror polished Granite stone slab 18mm thick (single piece not more than 150 cm) for Doors/Windows Cill and Jambs cladding as per design including full molded round front edge and 1 em nosing and laid on 20 mm thick cement mortar 1:6 (1 cement 6 coarse sand) jointed with grey cement slurry including rubbing and polishing finishing etc complete.	27.000	Smt	2089.19	56408.13
24	Item No. 24 Providing and fixing standard extruded of alluminium section of size 63 mm x 38.10 mm x 1.20 mm (jindal section 2434 @ Wt. 0.643 Kg/mt) with colour anodized alluminium frame for ventilation with 5 mm thick frosted glass as details etc. complete. For Ventilation.	9.480	Smt	1175.56	11144.31
25	Item No. 25 Applying two coats of Birla or Asian acrylic lapy (putty) & two coats of primer of approved brand and manufacture on new wall surface to give an even shade including thoroughly brushing the surface free from mortar dropping and otheer foreeign matter and sand papered smooth.	525.000	Smt	40.59	21309.75
26	Item No. 26 Wall painting (Three coats) with plastic emulsion paint of approved brand and manufacture on undercoraed wall surfaces to give an even shade incl. thoroughly brushing the surface free from mortar dropings and other foreign matter and sand papered smooth.	525.000	Smt	79.22	41590.50
27	Item No. 27 Finishing wall with weather proof exterior emulsion paint on wall surface (Two coats) to give an required shape even shade after thoroughly brushing the surface to reemove all dirt and remains of loose powdered materials etc. complete.	345.000	Smt	114.53	39512.85
28	Item No. 28 Provdbg. & fixing water closet squatting pna (Indian type W.C. Pan) size 580 mm (Earthwork, bed concrete, foot rests and trap to be measured and paid for separately). (A) Vitreous China :(I) In white colour	3.000	No.	935.36	2806.08
29	Item No. 29 Provdbg. & fixing 100 mm size P or S trap for water closet squatting pan incl. Jointing the trap with the pan & soil pipe in cement mortar 1:1 ( 1 cement : 1 fine sand) (A) Vitreous China.	3.000	No.	314.97	944.91

30	Item No :- 30 Proc'dg. & fixing wash basin with single hole for pillar tap with C.I. or M.S. brackets painted white incl. Cutting holes and making good the same but excluding fittings. (A) Vitreous China : (II) Flat back washbasin 550 mm x 400 mm size (I) In white colour including C.P. Brass west , West pipe, Stop tap	6.000	Rmt	1836.79	11020.74
31	Item No. 31 Providing laying and jointing in true line and level UPVC pipe (SCH-40) of following dia. Including fittings of standard make as approved by Engineer in charge pipe shall be fixed on the wall with the help of clamp at every 2000 mm center to center or shall be concealed as directed including necessary fittings etc. including testing of pipe and joints and fixing the same with adhesive solvent, including cost of all materials (A) 15 mm	45.000	Mtr.	72.65	3269.25
32	Item No. 32 Providing laying and jointing in true line and level UPVC pipe (SCH-40) of following dia. Including fittings of standard make as approved by Engineer in charge pipe shall be fixed on the wall with the help of clamp at every 2000 mm center to center or shall be concealed as directed including necessary fittings etc. including testing of pipe and joints and fixing the same with adhesive solvent, including cost of all materials (C) 25 mm	45.000	Mtr.	91.84	4132.80
33	Item No - 33 Providing & fixing screw down bib taps of following size(A) Brass screw down bib tap polished bright (ii)20 mm dia	9.000	No.	214.81	1933.29
34	Item No- 34 Providing & fixing PVC SWR Nahni trap Is 14735 for drain 100 mm diameter with jali of the following nominal diameter of self cleansing design with CI screed down or hinged grating including the cost of cutting and making good the walls.	3.000	No.	571.08	1713.24
35	Item No. 35 Prov'dg. & fixing S.W. Gully trap with C.I. grating brick masonry chamber & water tight C.I. cover with frame of 300 mm x 300 mm size (inside) with standard weight (A) 100 mm x 100 mm size P-type.	6.000	No.	1292.19	7753.14
36	Item no. 36 Prov'dg. & fixing to wall ceiling and floor 10.0 kg.F/cm <sup>2</sup> (UPVC) working pressure polythelene pipes of the following outside dia, low density, complete with special flange compression type fittings, wall clips etc. incl. Making good the wall ceiling and floor.(A) 110 mm	45.000	Rmt	277.43	12484.35
37	Item no. 37 Prov'dg. & fixing to wall ceiling and floor 6.0 kg.F/cm <sup>2</sup> (UPVC) working pressure	30.000	Rmt	336.24	10087.20

	polythelene pipes of the following outside dia, low density, complete with special flange compression type fittings, wall clips etc. incl. Making good the wall ceiling and floor.(A) 110 mm				
38	Item No. 38 Construction underground sock well 1.50 m diameter & 3 mt in depth with Honey comb Brick masonry having crushing stg. Not less than 35 Kg/ sqmt in C.M. 1:5, 0.35 m thick at bottom 1.50 mt & 0.23 mt thick 1.00 m of honey comb masonry and 0.23 m thick 0.50 m Ht at top level RCC 1:2:4 slab 0.10 m thick of top including inspection gap 0.60 m x 0.45 m and cover Ready made F.R.c. cover whole work as per instruction of Engineer in charge etc. complete	3.000	No.	17048.80	51146.40
39	Item No. 39 Providing & fixing double coated Syntex or equivalent PVC (ISI) water tank or required capacity each with all necessary fittings and connection etc. complete on terrace.	3000.000	Ltr.	3.95	11850.00
40	Item No. 40 provdng & fixing M.S. grills of required pattern to wooden frames of window etc. with M.S. flats at required spacings and frame alround, square or round bars with round headed bolts and nuts or by screws (A) plain grill	1050.000	Kg.	101.17	106228.50
41	Item No- 41 Painting Two coat (Excl.piming coat) on previously painted steel & other metal surfaces with synthetic enamel paint brushing to give an even shade incl. Cleanig the surface of all dirt, dust and other foreign matter.	81.000	Smt	65.31	5290.11
42	Item No. 42 Provdg. & fixing gun metal check or nonreturn full way wheel valve. (C) 25 mm dia.	6.000	No.	420.63	2523.78
43	Item no- 43 Providing and fixing pre-cast Rubber Dye inter locking concrete block 60 mm thick with grade of concrete M-200 pnumatic compressed by mechanically passed and as per approved design including 75 mm sand layer for levelling and filling the joint with sand in proper line and level etc. complete.	33.600	Cmt	686.90	23079.84
44	Item no- 44 Point wiring for Light / Bell with 2-1.5 sq.mm & earthwire of 1.5 sq.mm (Green) both are of ISI marked 1.1 KV grade FRLS PVC insulated multistrand copper wires, in following type of pipe to be erected concealed in/ on surface on wall/ceiling complete with 6A Modular type switch / bell push & accessories and earth continuity of following type, erected on PVC / Metallic box, single mounting base frame covered with textured/metallic front plate	24.000	Point	467.63	11223.12

	modules erected on / in wall / ceiling as per pipe erected, with necessary Lamp holder/ceiling rose / H.D.Connector as directed. CAT- III				
45	Item No- 45 Point wiring for looped PLUG with tissino type single pole ISI marked 6 A. switch and 6 A socket erected with necessary connections erected on polished wooden block / Metal / PVC box covered with 3 mm. thick laminated sheet for open / concealed wiring.	6.000	Point	167.66	1005.96
46	Item no. 46 Pipe type earthing having 150 cms long and 2.5 cms dia galvanised iron pipe with coupling and buch burried inspecially prepared earth pit complete with necessary 8 SWG earth wire.	3.000	Each	434.30	1302.90
47	Item No- 47 For using salt and charcoat / coke as required for pipe type earthing.	3.000	Each	202.00	606.00
48	Item no- 48 Approved make ceiling fan with condenser A.C. 230 V50 Cys.1200 mm. sweep complete canopy and 30 Cms. down rod resistance type regulator erected on existing hook or clamp with 24/0.2 flat 3 core flexiblewire with earthing fan approved by Engineer in charge	6.000	Each	1717.00	10302.00
49	Item no- 49 Plastic encloser fitted with din rail suitable for incorporating one / two nos. MCB	6.000	Each	60.60	363.60
50	Item No.- 50 UGVC Ltd. meter connection charges	3.000	Each	5670.14	17010.42
51	Item No.- 51 Poswer connection charges from UGVCL/ GEB incl. in all Estimate charge & meter connection given by UGVCL/GEB	3.000	Each	5050.00	15150.00
52	Item No.- 52 Providing &fixing 0.5 HP Submercible pump of approved make etc. completed.	3.000	No.	5000.00	15000.00
53	Item No.- 53 Bala Painting the whole Building with oil paints with different kind of picturea sd approved by EIC	3.000	Job	10000.00	30000.00
54	Item No.- 54 Applying general insecticide pest control treatment to floors cupboards etc including labour materilas etc. complete using Imidaclopried 30.5 SCs per IS 6313 Part-II (0.075 % concentration by mass	216.000	Smt	89.28	19284.48
55	Item no- 55 Approved make C.F.L. lamp retrofit 9/11 watt erected if required cat- ii	12.000	Each	65.65	787.80
56	Item no- 56 Providing and laying cement concrete 1:3:6 (1- Cement : 3- Coarse sand : 6- crushed stone aggregate 40mm normal size) and curing complete excluding cost of formwork in (A) Foundation and Plinth	1.050	Cum	4046.21	4248.52
57	Item no- 57 Providing and fixing pre-cast Rubber Dye/steel Dye interlocking concrete block 60 mm thick with grade of concrete M300 pnumatic	216.000	Smt	740.51	159950.16

	compressed /vibrated mechanically and as per approved design Confirming to IS 15658 : 2006 including 35mm Sand layer for levelling and filling the joint with sand in proper line and level as per guidlines of IRC : SP 63-2018 etc. Complete.				
58	Item no- 58 Excavation for foundation upto 1.5 mt.depth including sorting out and stacking of useful materials and disposing of the excavated stuff up to 50meter lead (B) Dense or Hard soil	13.470	Cmt	149.67	2016.05
59	Item no- 59 Providing and laying cement concrete 1:2:4 (1 Cement : 2- Coarse sand : 4-graded stone aggregates 20 mm nominal size) and curing complete excluding cost of formwork in (A) Foundation and Plinth	2.340	Cmt	3697.91	8653.11
60	Item no- 60 Providing 15mm thick cement plaster in single coat on brick /concrete walls for interior plastering upto floor two level and finished even and smooth in. (ii)Cement mortar 1:4 (1 cement:4-sand ) with finishing in floating coat of neat cement slury	40.920	Smt	205.37	8403.74
61	Item no- 61 Providing and laying cement concrete flooring 1:2:4 (1-cement : 2-coarse sand : 4-graded stone aggregate 20mm nominal size) laid in one layer and finished with a floating coat of neat cement. (B) 50mm thick.	4.320	Cmt	351.56	1518.74
62	Item no- 62 Providing and laying in ground 110 mm diameter PVC rain Water pipe 6 Kg./ Sq.cm. necessary fittings connection as per detailed drawing as directed by Engineer - in - charge.	90.000	Rmt	334.08	30067.20
63	Item no- 63 Providing and laying in ground 150mm diameter PVC rain Water pipe 6 Kg./ Sq.cm. necessary fittings connection as per detailed drawing as directed by Engineer - in - charge.	30.000	Rmt	429.76	12892.80
64	Item no- 64 Providing formwork of ordinary timber planking so as to give a rough finish including centering shuttering strutting and propping etc. Height of propping and centering below supporting floor to ceiling not exceeding 4M. and removal of the same for in situ reinforced concrete and plain concrete work in. (A) Foundations Footings Bases of Columns etc. and Mass concrete.	3.600	Smt	173.40	624.24
65	Item no- 65 Supplying of crused stone aggregate of 25 to 40 mm size as directed with 5 Km. lead	0.600	Cum	661.90	397.14
66	Item no- 66 Supplying of coarse sand as directed with 5 Km. lead	1.830	Cum	419.42	767.54
	-			Total	3598480.50

Rs. Thirty Five Lacs Ninety Eight Thousand Four Hundred Eighty & Paisa Fifty Only

I/We am / are willing to carry out the work at ..... %  
above/ below percent (Should be written in figures and words) of the estimated rate mentioned above. Amount  
of my/ our tender works out as under.

\*Estimated Amount

\*Estimated Amount

Put to tender Rs. .... Put to tender Rs. ....

Add.....% above Rs. .... Deduct .....% below Rs. ....

Total Rs. .... Net. Rs. ....

In Words ..... In Words .....

(\* Please strike out whichever is not applicable.)

Notes 1 - All work shall be carried out as per Public Works Department Handbook and other specifications of  
Division or as directed.

નોંધ -૧ :- બધું જ કામ બાંધકામ વિભાગની પુસ્તિકા અને ડિવિઝનની બીજી ખાસ વિગત મુજબ અથવા સૂચના પ્રમાણે કરી આપવાનું રહેશે.

Notes 2 - All the columns in Schedule should be filled in ink and the total of the entries in the last column should  
be struck by the contractor under his signature.

નોંધ -૨ :- અનુસૂચિમાં બધા ખાનાની વિગતો સહીથી ભરવી અને છેલ્લા ખાનાની નોંધોનો સરવાળો કરી કોન્ટ્રાક્ટરે પોતાની સહી કરવી

Deputy Executive Engineer  
R & B Panchayat Sub Division  
Ahmedabad

Executive Engineer  
R & B Panchayat Divisions  
Ahmedabad

# **Specification**

**Name of Work :- Const. Of Various Anganwadi Building in Dascroi Taluka  
Dist. Ahmedabad Package No. AHD/ANGWNADI/12 (2026-2027) (Zanu-1,  
Gatrad-5, Pardhol-3 ) Total -3**

**TENDER OF ITEM SPECIFICATION**

Sr. No.	Name of road	Item No.	Page No.
1	Item No. 1 Excavation for foundation upto 1.5 m. depth incl. sorting out stacking of seful materials and disposing off the excavated stuff upto 50mt lead.(A) Loose or soft soil		
2	Item No. 2 Filling in plinth with sand under floors incl. watering ramming consolidating and dressing etc.comp.		
3	Item No. 3 Providing and laying Cement concrete 1:4:8 (1 cement:4 coarse sand:8 Graded Stone Agg. 40 mm nominal Size ) & Quaring etc. complete. Excluding cost of form work in (A)Foundation & Plinth		
4	Item No. 4 Filling available excavated Earth (Excluding Rock) in trench plinth side of foundation etc. in layer not excluding 20 cm in depth consolidation each deposited layer by ramming and watering etc. complete		
5	Item No- 5 Brick work using common burnt clay building bricks having crushing strength not less than 35 kg/ sq. C.M. In foundation and plinth in cement mortar 1:6 ( 1cement : 6 fine sand)		
6	Item No- 6 Brick work using common burnt clay building bricks having crushing strength not less than 35 kg/ sq. C.M. In foundation and plinth in cement mortar 1:6 ( 1cement : 6 fine sand) in super structure		
7	Item no- 7 Providing and laying ordinary Cement concrete 1:1.5:3 (1 Cement 1.5 coarse sand 3 graded stone agg. 20 mm nominal size) for RCC lintel including finishing smooth with curing etc. complete including the cost of formwork but excluding the cost of reinforcement.		
8	Item no. 8 Providing and laying ordinary cement concrete 1:1.5:3 (1 Cement : 1.5 coarse sand : 3 graded stone aggregates 20mm nominal size) and curing complete Including cost of form work in (i) Beam Having cross-sectional area 0.08 to 0.12 sq. m.		
9	Item No- 9 Provdbg & laying Ordinary cement concrete 1:1.5:3 (1cement : 1.5 coarse sand 3 graded stone aggregate 20 mm nominal size) and finishing the smooth with curing etc. complete including the cost of formwok but excluding the cost of reinforcement for RCC work in (II) slabs having more than 10 cm and upto 13 cm thickness.		
10	Item No- 10 Provdbg & laying cement concrete 1:1.5:3 (1cement : 1.5 coarse sand :3 graded stone aggregated 20 mm nominal size) and curing complete excluding cost of form work and reinforcement for reinforced concrete work in (A) Foundation, footings, of columns and mass concrete		



11	Item No- 11 Provdg & laying Ordinary cement concrete 1:1.5:3 (1cement : 1.5 coarse sand 3 graded stone aggregate 20 mm nominal size) and finishing the smooth with curing etc. complete including the cost of formwork but excluding the cost of reinforcement for RCC work in (II) COLUMNS (i) Having cross sectional area 0.05 to 0.08 Sq.M.		
12	Item no- 12 Provi. Providing thermo Mechanically treated bars (TMT bars) confirming to IS 1786 / FC 415 for R.C.C. works including, bending, binding and placing in position complete upto floor 2 level.		
13	Item no- 13 Half brick masonry in common burnt clay building bricks having crushing strength not less than 35kg/Sq.Cm in cement mortar 1:4 (1 cement : 4 coarse sand) in foundation and plinth (B) Conventional		
14	Item No. 14 Providing 15 mm thick cement plaster in single coat on brick/ concrete walls for interior plastering up to floor two level finished even & smooth in (II) cement mortar (1 cement : 3 sand) Including finishing with a floating coat of neat cement slurry .		
15	Item no. 15 Provdg. 10 mm th. Cement plaster in single coat on brick/concrete walls for interior plastering up to floor two level & finished even & smooth in (1) cement mortar 1:3 (1 cement : 3 sand)		
16	Item No. 16 20 mm thick sand faced cement plaster on walls upto height 10 meters above ground level consisting of 12 mm thick backing coat of C.M.1:3 (1 Cement : 3 sand) and 8 mm thick finishing coat of C.M.1:1 (1 Cement 1 Sand) Watering curing etc. comple.		
17	Item No- 17 Providing and laying Vitrified tiles 8 to 10 mm thick in skirting risers of steps and dedo on 10 mm thick cement plaster 1:3 (1 Cement 3 coarse sand) and jointed with white cement slurry		
18	Item No. 18 Providing and laying 24" x 24" Vitrified 8 mm thick Tile flooring over 20 mm (Avg) base of C.M. 1:6 on new surface or fixing on Extg. Flooring by adhesive material incl. Dismantling of extg. Flooring & jointed with colour cement slurry finished with flush pointing & cleaning the surface etc. complete for antiskit		
19	Item No. 19 : Providing & laying broken china mosaic flooring for terrace using 12 mm to 20 mm broken pieces of glazed tiles to be laid over cement mortar 1:3 in plain or slope and to be tempered to bring mortar crême out up to surface using white cement including rounding off junction and extending them up to 15 cm along the well cleaning with water and oxalic acid as directed.		
20	Item No- 20 Provdg. & laying white glazed tiles 6 mm th. In flooring, treads of steps & landings laid on a bed of 12 mm th. Cement mortar 1:3 (1cement : 3 coarse sand finished with flush pointing in white cement.		
21	Item No- 21 Providing and Fixing Door having granite frame flat edge polished with standard extruded coloured anodized aluminum section frame outer size 127mm * 38.1mm * 1.35mm (weight 1.384 Kg/rmt) side hung Double shutter having factory fabricated std.actory made 50 mm thick flush door both side laminated with S.S. Handle size 60 cm long. and SS fixtures & fastenings. as per details colour and pattern approved by architech including necessary stainless steel fixtures and fastenings. etc. complete.		
22	Item No. 22 Providing and fixing extruded aluminium windows having extruded aluminium colour anodized section frame main outer size 95 mm x 24 mm x 1.17 mm (of jindal section No. 2459 @ Wt. 0.738 Kg/ mt) horizontal four track member size 92 mm x 31.75 mm x 1.30 mm (of jindal section No. 8688 @ Wt. 1.07Kg/ mt)		

	vertical member of size 92 mm x 31.75 mm x 1.50 mm (of jindal section No. 8933 @ Wt.1.06 Kg/ mt) with sliding shutters of horizontal member size 40 mm x 18 mm x 1.29 mm (of Jindal Section no. 8947 @ wt. of 0.456 Kg/ mt) Vertical member of size 40 mm x 18 mm x 1.29 mm ( of Jindal section No. 8949 @ Wt. of 0.456 Kg/ mt) with 5 mm thick transparent bronze colour tinted float glass with powder coated aluminium silicon sealant glass fixing to frame as per details etc. complete.		
23	Item No. 23 Providing and Fixing Machine cut, free edges, pre mirror polished Granite stone slab 18mm thick (single piece not more than 150 cm) for Doors/Windows Cill and Jambs cladding as per design including full molded round front edge and 1 cm nosing and laid on 20 mm thick cement mortar 1:6 (1 cement 6 coarse sand) jointed with grey cement slurry including rubbing and polishing finishing etc complete.		
24	Item No. 24 Providing and fixing standard extruded of aluminium section of size 63 mm x 38.10 mm x 1.20 mm (jindal section 2434 @ Wt. 0.643 Kg/mt) with colour anodized aluminium frame for ventilation with 5 mm thick frosted glass as details etc. complete. For Ventilation.		
25	Item No. 25 Applying two coats of Birla or Asian acrylic lapy (putty) & two coats of primer of approved brand and manufacture on new wall surface to give an even shade including thoroughly brushing the surface free from mortar dropping and other foreign matter and sand papered smooth.		
26	Item No. 26 Wall painting (Three coats) with plastic emulsion paint of approved brand and manufacture on undercoated wall surfaces to give an even shade incl. thoroughly brushing the surface free from mortar droppings and other foreign matter and sand papered smooth.		
27	Item No. 27 Finishing wall with weather proof exterior emulsion paint on wall surface (Two coats) to give an required shape even shade after thoroughly brushing the surface to remove all dirt and remains of loose powdered materials etc. complete.		
28	Item No. 28 Providg. & fixing water closet squatting pna (Indian type W.C. Pan) size 580 mm (Earthwork, bed concrete, foot rests and trap to be measured and paid for separately). (A) Vitreous China : (I) In white colour		
29	Item No. 29 Providg. & fixing 100 mm size P or S trap for water closet squatting pan incl. Jointing the trap with the pan & soil pipe in cement mortar 1:1 ( 1 cement : 1 fine sand) (A) Vitreous China.		
30	Item No :- 30 Procdg. & fixing wash basin with single hole for pillar tap with C.I. or M.S. brackets painted white incl. Cutting holes and making good the same but excluding fittings. (A) Vitreous China : (II) Flat back washbasin 550 mm x 400 mm size (I) In white colour including C.P. Brass west , West pipe, Stop tap		
31	Item No. 31 Providing laying and jointing in true line and level UPVC pipe (SCH-40) of following dia. Including fittings of standard make as approved by Engineer in charge pipe shall be fixed on the wall with the help of clamp at every 2000 mm center to center or shall be concealed as directed including necessary fittings etc. including testing of pipe and joints and fixing the same with adhesive solvent, including cost of all materials (A) 15 mm		
32	Item No. 32 Providing laying and jointing in true line and level UPVC pipe (SCH-40) of following dia. Including fittings of standard make as approved by Engineer in charge pipe shall be fixed on the wall with the help of clamp at every 2000 mm center to center or shall be concealed as directed including necessary		

	fittings etc. including testing of pipe and joints and fixing the same with adhesive solvent, including cost of all materials (C) 25 mm		
33	Item No - 33 Providing & fixing screw down bib taps of following size(A) Brass screw down bib tap polished bright (ii)20 mm dia		
34	Item No- 34 Providing & fixing PVC SWR Nahni trap Is 14735 for drain 100 mm diameter with jali of the following nominal diameter of self cleansing design with CI scread down or hinged grating including the cost of cutting and making good the walls.		
35	Item No. 35 Provdg. & fixing S.W. Gully trap with C.I. grating brick masonry chamber & water tight C.I. cover with frame of 300 mm x 300 mm size (inside) with standard weight (A) 100 mm x 100 mm size P-type.		
36	Item no. 36 Provdg. & fixing to wall ceiling and floor 10.0 kg.F/cm <sup>2</sup> (UPVC) working pressure polythelene pipes of the following outside dia, low density, complete with special flange compression type fittings, wall clips etc. incl. Making good the wall ceiling and floor.(A) 110 mm		
37	Item no. 37 Provdg. & fixing to wall ceiling and floor 6.0 kg.F/cm <sup>2</sup> (UPVC) working pressure polythelene pipes of the following outside dia, low density, complete with special flange compression type fittings, wall clips etc. incl. Making good the wall ceiling and floor.(A) 110 mm		
38	Item No. 38 Construction underground sock well 1.50 m diameter & 3 mt in depth with Honey comb Brick masonry having crushing stg. Not less than 35 Kg/ sqmt in C.M. 1:5, 0.35 m thick at bottom 1.50 mt & 0.23 mt thick 1.00 m of honey comb masonry and 0.23 m thick 0.50 m Ht at top level RCC 1:2:4 slab 0.10 m thick of top including inspection gap 0.60 m x 0.45 m and cover Ready made F.R.c. cover whole work as per instruction of Engineer in charge etc. complete		
39	Item No. 39 Providing & fixing double coated Syntex or equivalent PVC (ISI) water tank or required capacity each with all necessary fittings and connection etc. complete on terrace.		
40	Item No. 40 provdg & fixing M.S. grills of required pattern to wooden frames of window etc. with M.S. flats at required spacings and frame alround, square or round bars with round headed bolts and nuts or by screws (A) plain grill		
41	Item No- 41 Painting Two coat (Excl.piming coat) on previously painted steel & other metal surfaces with synthetic enamel paint brushing to give an even shade incl. Cleanig the surface of all dirt, dust and other foreign matter.		
42	Item No. 42 Provdg. & fixing gun metal check or nonreturn full way wheel valve. (C) 25 mm dia.		
43	Item no- 43 Providing and fixing pre-cast Rubber Dye inter locking concrete block 60 mm thick with grade of concrete M-200 pnumatic compressed by mechanically passed and as per approved design including 75 mm sand layer for levelling and filling the joint with sand in proper line and level etc. complete.		
44	Item no- 44 Point wiring for Light / Bell with 2-1.5 sq.mm & earthwire of 1.5 sq.mm (Green) both are of ISI marked 1.1 KV grade FRLS PVC insulated multistrand copper wires, in following type of pipe to be erected concealed in/ on surface on wall/ceiling complete with 6A Modular type switch / bell push & accessories and earth continuity of following type, erected on PVC / Metallic box, single mounting base frame covered with textured/metallic front plate modules erected on / in wall / ceiling as per pipe erected, with necessary Lamp holder/ceiling rose / H.D.Connector as directed. CAT- III		

45	Item No- 45 Point wiring for looped PLUG with tissino type single pole ISI marked 6 A. switch and 6 A socket erected with necessary connections erected on polished wooden block / Metal / PVC box covered with 3 mm. thick laminated sheet for open / concealed wiring.		
46	Item no. 46 Pipe type earthing having 150 cms long and 2.5 cms dia galvanised iron pipe with coupling and buch burried inspecially prepared earth pit complete with necessary 8 SWG earth wire.		
47	Item No- 47 For using salt and charcoat / coke as required for pipe type earthing.		
48	Item no- 48 Approved make ceiling fan with condenser A.C. 230 V50 Cys.1200 mm. sweep complete canopy and 30 Cms. down rod resistance type regulator erected on existing hook or clamp with 24/0.2 flat 3 core flexiblewire with earthing fan approved by Engineer in charge		
49	Item no- 49 Plastic encloser fitted with din rail suitable for incorporating one / two nos. MCB		
50	Item No.- 50 UGVC Ltd. meter connection charges		
51	Item No.- 51 Poswer connection charges from UGVCL/ GEB incl. in all Estimate charge & meter connection given by UGVCL/GEB		
52	Item No.- 52 Providing &fixing 0.5 HP Submercible pump of approved make etc. completed.		
53	Item No.- 53 Bala Painting the whole Building with oil paints with different kind of picturea sd approved by EIC		
54	Item No.- 54 Applying general insecticide pest control treatment to floors cupboards etc including labour materilas etc. complete using Imidaclopried 30.5 SCs per IS 6313 Part-II (0.075 % concentration by mass		
55	Item no- 55 Approved make C.F.L. lamp retrofit 9/11 watt erected if required cat-ii		
56	Item no- 56 Providing and laying cement concrete 1:3:6 (1- Cement : 3- Coarse sand : 6- crushed stone aggregate 40mm normal size) and curing complete excluding cost of formwork in (A) Foundation and Plinth		
57	Item no- 57 Providing and fixing pre-cast Rubber Dye/steel Dye interlocking concrete block 60 mm thick with grade of concrete M300 pnumatic compressed /vibrated mechanically and as per approved design Confirming to IS 15658 : 2006 including 35mm Sand layer for levelling and filling the joint with sand in proper line and level as per guidlines of IRC : SP 63-2018 etc. Complete.		
58	Item no- 58 Excavation for foundation upto 1.5 mt.depth including sorting out and stacking of useful materials and disposing of the excavated stuff up to 50meter lead (B) Dense or Hard soil		
59	Item no- 59 Providing and laying cement concrete 1:2:4 (1 Cement : 2- Coarse sand : 4- graded stone aggregates 20 mm nominal size) and curing complete excluding cost of formwork in (A) Foundation and Plinth		
60	Item no- 60 Providing 15mm thick cement plaster in single coat on brick /concrete walls for interior plastering upto floor two level and finished even and smooth in. (ii)Cement mortar 1:4 (1 cement:4-sand ) with finishing in floating coat of neat cement slury		

61	Item no- 61 Providing and laying cement concrete flooring 1:2:4 (1-cement : 2-coarse sand : 4-graded stone aggregate 20mm nominal size) laid in one layer and finished with a floating coat of neat cement. (B) 50mm thick.		
62	Item no- 62 Providing and laying in ground 110 mm diameter PVC rain Water pipe 6 Kg./ Sq.cm. necessary fittings connection as per detailed drawing as directed by Engineer - in - charge.		
63	Item no- 63 Providing and laying in ground 150mm diameter PVC rain Water pipe 6 Kg./ Sq.cm. necessary fittings connection as per detailed drawing as directed by Engineer - in - charge.		
64	Item no- 64 Providing formwork of ordinary timber planking so as to give a rough finish including centering shuttering strutting and propping etc. Height of propping and centering below supporting floor to ceiling not exceeding 4M. and removal of the same for in situ reinforced concrete and plain concrete work in. (A) Foundations Footings Bases of Columns etc. and Mass concrete.		
65	Item no- 65 Supplying of crushed stone aggregate of 25 to 40 mm size as directed with 5 Km. lead		
66	Item no- 66 Supplying of coarse sand as directed with 5 Km. lead		

Deputy Executive Engineer  
R & B Panchayat Sub Division  
Ahmedabad

Executive Engineer  
R & B Panchayat Division  
Ahmedabad

## **GENERAL TECHNICAL SPECIFICATIONS**

### **1.0 General :**

All measurements shall be made in the metric system. Different items of work shall be measured in accordance with the procedures set forth in the relevant sections read in conjunction with General Conditions of Contract. The same shall not however apply in the case of lump-sum items. All measurements and computations unless otherwise indicated shall be carried nearest to the following limits :

- (i) length and breadth..... 10 mm
  - (ii) height, depth or thickness of earthwork, sub-base, bases, surfacing, and structural members .....5 mm
  - (iii) areas, .....0.01 Sq. Metre
  - (iv) cubic contents..... 0.01 cubic metre
- in recording dimensions of work the sequence of length, width and height or depth or thickness shall be followed.

## 2.0 Measurement of lead for Materials :

Where lead is specified in the contract for construction materials, the same shall be measured as described hereunder.

Lead shall be measured over the shortest practicable route and not the one actually taken and the decision of the Engineer-in-charge in this regard shall be taken as final. Distance upto and including 100 meters shall be measured in units of 50 metres, exceeding 100 metres but not exceeding 1 KM. in units of 100 metres and exceeding 1 km. in units of 500 metres. The half and greater than half of the units shall be reckoned as one and less than half of the units ignored. In this regard, the source of the material shall be divided into suitable blocks and for each block the distance from the centre of the block to the centre of placing pertaining to that block shall be taken as the lead distance.

## 3. Surface Regularity of Sub grade & Pavement Courses :

The surface regularity of completed sub-base courses and wearing surfaces in the longitudinal and transverse directions shall be within the tolerances indicated in Table below. The longitudinal profile shall be checked with a 3 metre long straight edge, at the middle of each traffic lane along a line parallel to the centre line of the road. The transverse profile shall be checked with a set of three camber boards at intervals of 10 metres.

### PERMITTED TOLERANCES OF SURFACE REGULARITY FOR PAVEMENT COURSES

Sr. No.	Type of Construction	Longitudinal Profile with 3 metre straight edge					Cross Profile
		Maximum Permissible undulation in mm	Maximum number of undulation permitted in any 300m. length exceeding in mm.				Maximum permissible variation from specified profile camber template—mm
			18	12	10	6	
1	2	3	4	5	6	7	8
1	Earth Sub grade	36	30	-	-	-	15
2	Granular / lime / Cement Stabilised Sub – base.	23	-	30	-	-	12
3	Water Bound Macadam with nominal size metal (20-50) mm	18	-	-	30	-	8
4	Semi – Dense Carpet @	15	-	-	-	20	6

#### Notes:-

- These are for machine laid surfaces. If laid manually, due to unavoidable reason, tolerance upto 50 percent above these values in this column may be permitted. However, this relaxation does not apply to the values of maximum undulation for longitudinal and cross profiles mentioned in columns 3 and 8 in the table.
- Surface evenness requirements in respect of both the longitudinal and cross profiles should be simultaneously satisfied.

**3. Rectification** : Where the surface irregularity of subgrade and the various pavement courses fall outside the specified tolerances, the contractor shall be liable to rectify these in the manner described below and to the satisfaction of the Engineer-in-charge at his own cost.

**(i) Subgrade** : Where the surface is high, it shall be trimmed and suitably compacted. Where the same is low, the deficiency shall be corrected by adding fresh material. The degree of compaction and the type of material to be used shall conform to the specified requirements.

**(ii) Granular/Sub-base** : Same as at (i) above except that the degree of compaction and the type of material to be used shall conform to the specified requirements.

**(iii) Lime/Cement stabilized soil sub-base** : For Lime/Cement treated materials where the surface is high, the same shall be suitably trimmed while taking care that the material below is not disturbed due to this operation. However, where the surface is low, the same shall be corrected as described herein below.

For cement treated material, when the time elapsed between detection of irregularity and the time of mixing of the material is less than 2 hours, the surface shall be scarified to a depth of 50 mm, supplemented with freshly mixed material as necessary and recomposed to the relevant specification. When this time is more than 2 hours, the full depth of the layer shall be removed from the pavement and replaced with fresh material to specification. In either case, the area treated shall not be less than 5 metres long by 2 metres wide. This shall also apply to lime treated material except that the time criterion shall be 3 hours instead of 2 hours.

**(iv) Water Bound Macadam Base** : Where the surface is high or low, the top 75mm shall be scarified, reshaped with added material as necessary and recompacted. The area treated at a place shall not be less than 5 metres long and 2 metres wide.

**(v) Bituminous Constructions** : For bituminous constructions, other than wearing course, where the surface is low, the deficiency shall be corrected by adding fresh material and recompaction to specifications.

Where this surface is high, the full depth of the layer shall be removed and replaced with fresh material and compacted to specifications. For wearing course, where the surface is high or low; the full depth of the layer shall be removed and replaced with fresh material and compacted to specifications in all cases where the removal and replacement of a bituminous layer is involved, the area treated shall not be less than 5 metre long and not less than 1 lane wide.

#### **4. Quality Control Tests During Construction :**

The materials supplied and the works carried out by the Contractor shall conform to the enclosed relevant specifications. For ensuring the requisite quality of construction, the materials and works shall be subjected to quality control test as described hereinafter, by the Engineer-in-charge. The testing frequencies set forth are the desirable minimum and the Engineer-in-charge shall have the full authority to carry out test as frequently as he may deem necessary to satisfy that the materials at work comply with the appropriate specifications. Test procedures for the various quality control tests are indicated in the respective sections of the specifications or for certain tests within this section. Where no specific testing procedure is mentioned, the test shall be carried out as per prevalent accepted engineering practice to the directions of the Engineer-in-charge.

#### **5. Tests on Earthwork for Embankment Construction :**

##### **5.1 Borrow Material :**

- (a) Sand Content (IS : 2720 Part IV)  
Two test per 8000 Cubic Metres of soil.
- (b) Plasticity Test (IS : 2720 Part-V)  
Each type to be tested. Two tests per 8000 Cubic Metres of soil.
- (c) Density test (IS : 2720 Part VII)  
Each soil type to be tested. Two tests per 8000 Cubic Metres of soil.
- (d) Moisture Content Test (IS : 2720 Part-II)  
One test for every 250 Cubic Metres of soil.

##### **5.2 Compaction Control :**

Control shall be exercised by taking at least one measurement of density for each 1000 square metres of compacted area, or closer as required to yield the minimum number of test results for evaluating day's work on statistical basis. The determination of density shall be in accordance with IS : 2720 (Part XXVMI). Test locations shall be chosen only through random sampling techniques. Control shall not be based on the result of any one test but on the mean value of a set of 5-10 density determinations. The number of tests in one set of measurements shall be 5 as long as it is felt that sufficient control over borrow material and the method of compactions is being exercised. If considerable variations are observed between individual density results, the minimum number of tests in one set of measurement shall be increase to 10. The acceptance of work shall be subject to the condition that the mean dry density equals or exceeds the specified density and the standard

deviation for any set of results is below 0.08 gm/cc. However for earthwork in shoulders and in top 500 mm portion of the embankment below the sub grade, at least one density measurement shall be taken for every 500 square meters of the compacted area provided further that the number of the tests in each set-of measurement shall be at least 10. In other respects, the control shall be similar to that described earlier.

**6. Following materials shall conform to the Indian Standards shown against them :**

- (1) ....Cement.....
- (2) ....Sand for masonry.
- (3).....Sand for concrete.
- (4).....Coarse aggregate.
- (5).....Mild Steel...
- (6) ....High yield strength deformed bars
  - (a) Hot Rolled..... IS : 1139
  - (b) Cold Twisted..... IS : 1786

**7. Barrel thickness of pipes of different class shall be as under :**

Sr. No.	Internal Diameter of pipe in mm	Barrel thickness (in mm).		
		NP1	NP2	NP2
1	80	25	25	-
2	100	25	25	-
3	150	25	25	-
4	250	25	25	-
5	300	30	30	-
6	350	32	32	75
7	400	32	32	75
8	450	35	35	75
9	500	-	35	75
10	600	-	40	80
11	700	-	40	80
12	800	-	45	90
13	900	-	50	100
14	1000	-	55	100
15	1100	-	60	115
16	1200	-	65	115



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## GENERAL TECHNICAL SPECIFICATIONS FOR BUILDING WORKS

### GENERAL:

1. In the specifications "as directed" / "approved" shall be taken to mean "as directed" / "approved" by the Engineer-in-Charge".
2. Wherever a reference to any Indian Standard appears in the specifications, it shall be taken to mean as a reference to the latest edition of the same in force on the date of agreement.
3. In "Mode of Measurement" in the specifications wherever a dispute arises in the absence of specific mention of a particular point of aspect the provisions on these particular points, or aspects in the relevant Indian Standards shall be referred to
4. All measurements and computations, unless otherwise specified, shall be carried out nearest to the following limits:
  - (i) Length, width and depth (height) 0.01 meter
  - (ii) Areas 0.01 Sq.Mt.
  - (iii) Cubic Contents 0.01 Cu.Mt.

In recording dimensions of work the sequence of length, width and height (depth) or thickness shall be followed.
5. The distance which constitutes lead shall be determined along the shortest practical route and note necessarily the route actually taken The decision of the Engineer-in-charge in this regard shall be taken as final.
6. Where no lead is specific, it shall mean "all leads"
7. Lift shall be measured from plinth level.
8. Up to "floor two level" means actual height of floor (Maxi 4 M) up to 3 Mt. above plinth level.
9. Definite particulars covered in the items of work, though not mentioned or elucidated in it specifications shall be deemed to be included therein.
10. Reference to specifications of materials as made in the detailed specification of the items of works is in the form of a designation containing them kuber of the specification of the material and prefix 'M' e.g. 'M-5',
11. Approval to the samples of various materials given by the Engineer-in-charge shall not absolve the contractor from the responsibility of replacing defective material brought on site or materials used in the work found defective at a later date. The contractor shall have no claim

to any payment or compensation whatsoever on account of any such materials being rejected by the Engineer-in-charge.

12. The contract rate of the item of work shall be for the work completed in all aspects.
13. No collection of materials shall be made before it is got approved from the Engineer-in-charge.
14. Collection of approved materials shall be done at site of work in a systematic manner. Materials shall be stored in such a manner as to prevent damage, deterioration or intrusion of foreign matter and to ensure the preservation of their quality and fitness for the work.
15. Materials, if and when rejected by the Engineer-in-charge, shall be immediately removed from the site of work.
16. No materials shall be stored prior to, during and after execution of a structure in such a way as to cause or lead to damage or overloading of the various components of the structure.
17. All works shall be carried out in a workmanlike manner as per the best techniques for the particular item.
18. All tools, templates, machinery and equipment for correct execution of the work as well as for checking lines, levels, alignment of the works during execution shall kept in sufficient numbers and in good working condition on the site of the work.
19. The mode, procedure and manner of execution shall be such that it does not cause damage or over-loading of the various components of the structure during execution or after completion of the structure.
20. Special modes of construction not adopted in general Engineering practice if proposed to be adopted by the Contractor, shall be considered only if the contractor provides satisfactory evidence that such special mode of construction is safe, sound and helps in speedy construction and Completion of work to the required strength and quality. Acceptance of the same by the Engineer-in-Charge shall not, however absolve the contractor of the responsibility of any adverse effects and consequences of adopting the same in the course of execution of completion of the work.
21. All installations pertaining to water supply and fixtures there of as well as drainage lines and sanitary fittings shall be deemed to be completed only after giving satisfactory tests by the contractor.
22. The contractor shall be responsible for observing the rules and regulations imposed under the "Minor Minerals Act", and such of the laws and rules prescribed by Government from to time.
23. All necessary safety measures and precautions {including those laid down in the various relevant Indian Standards) shall be taken to ensure to ensure the safety of men. Materials and machinery on the works as also of the work itself.
24. The testing charges of all materials shall be borne by the Contractor.

25. Approval to any of the executed items for the work does not in any relieve the contractor of his responsibility for the correctness, soundness and strength of the structure as per the drawings and specifications.

## **SPECIFICATIONS OF MATERIALS**

### **M-1 Water**

- 1.1. Water shall not be salty brackish and shall be clean, reasonably clear and free objectionable quantities of silt and traces of oil and injurious alkalis, salts, organic matter and other deleterious material which will either weaken the mortar of concrete or cause efflorescence or attack the steel in R.C.C. Container for transport, storage and handling of water shall be clean. Water shall conform to the standard specified in I.S. 456-1978.
- 1.2. If required by the Engineer-in-Charge it shall be tested by comparison with distilled water Comparison shall be made by means of standard cement tests for soundness time of setting and mortar strength as specified in I.S. 269-1976. Any indication of unsoundness change in time of setting by 30 minutes or more or decrease of more than 10 per cent in strength, of mortar prepared with water sample when compared with the results obtained with mortar prepared with distilled water shall be sufficient cause for rejection of water under test.
- 1.3. Water for curing mortar, concrete or masonry should not be too acidic or too alkaline.  
It shall be free of elements which significantly affect the hydration reaction or otherwise interfere with the hardening of mortar or concrete during curing or those which produce objectionable stains or other unsightly deposits on concrete or mortar surfaces
- 1.4. Hard and bitter water shall not be used for curing.
- 1.5. Potable water will generally found suitable for curing mortar or concrete.

### **M-2. Lime**

- 2.1. Lime shall be hydraulic lime as per I.S. 712-1973 Necessary tests shall be carried out as per I.S. 6932 (Parts I to X) 1973
- 2.2. The following field tests for limes are to be earned out:
  - (1) A very rough idea can be formed about the type of lime by its visual examination i.e. fat lime bears pure white colour, lime in form of porous lumps of dirty white colour indicates quick lime, and solid lumps are the un burnt lime stone.
  - (2) Acid tests for determining the carbonate content in lime Excessive amount of impurities and rough determination of class of lime.
- 2.3. Storage shall comply with J.S. 712-1973 The slaked lime, if stored, shall be kept in a weather proof and damp- proof shed with impervious floor and sides to protect it against rain, moisture, weather and extraneous materials mixing with it. All lime that has been damaged in any way shall be rejected and all rejected materials shall be removed from site of work.
- 2.4. Field testing shall be done according to I.S 1624-1974 to show the acceptability of materials.

### **M-3. Cement**

- 3.1. Cement shall be ordinary Portland slag cement as per I.S.269-1976 or Portland slag cement as per I.S. 455-1976

### **M-4. White Cement**

- 4.1. The white cement shall conform to I. S. 8042-E-1978.,

**M-5. Coloured Cement**

- 5.1. Coloured cement shall be with white of grey Portland cement as specified in the item of the work.
- 5.2. The pigments used for coloured cement shall be of approved quality and shall not exceed 10% of cement used in the mix. The mixture of pigment add cement shall be properly ground to have a uniform colour and shade. The pigments shall have such properties to provide for durability underexposure to sunlight and weather.
- 5.3. The pigment shall have the property such that it is neither affected by the cement nor detrimental to it

**M-6 Sand**

- 6.1. Sand shall be natural sand, clean, well graded hard strong, durable and gritty particles free from injurious amounts of dust, clay kankar nodules, soft or flaky particles shale, alkali salts organic matter, loam, mica or other deleterious substances and shall be got approved from the Engineer-in-Charge. The sand shall not contain more than 8 percent of silt as determined by field test, if necessary the sand shall be washed to make it clean.
- 6.2. **Coarse Sand** :The fineness modulus of coarse sand shall not be less than 2.5 and shall not exceed 3.0. The sieve analysis of coarse shall be as under :

I.S. Sieve Designation	Percentage by Weight Passing sieve	I.S. Sieve Designation	Percentage by Weight Passing Sieve
4.75 mm	100	600 Micron	30 - 100
2.36 mm	90 to 100	300 Micron	5 - 70
1.18 mm	70 - 100	150 Micron	0 - 50

- 6.3. **Fine Sand** :The fineness modulus shall not exceed 1.0. The sieve analysis of fine sand shall be as under :

I.S. Sieve Designation	Percentage by Weight Passing through	I.S. Sieve Designation	Percentage by Weight Passing through
4.75 mm	100	600 Micron	40 - 85
2.36 mm	100	300 Micron	5 - 50
1.18 mm	70 - 100	150 Micron	0 - 10

**M-7 Stone Dust :**

- 7.1. This shall be obtained from crushing hard black trap or equivalent. It shall not contain more than 8% of silt as determined by field test will measuring cylinder. The method of determining silt contents by fields test is given as under :
- 7.2. A sample of stone dust to be tested shall be placed without drying in 200 mm. measuring cylinder. The quantity of the sample shall be such that it fills the cylinder up to 100 mm. mark. The clean water shall be added up to 150 mm. mark. The mixture shall be stirred vigorously and the content allowed to settle for 3 hours.
- 7.3. The height of silt, visible as settled layer above the stone dust shall be expressed as percentage of the height of the stone dust below. The stone dust containing more than 8% silt shall be washed so as to bring the content within the allowable limit.

7.4. The fineness modules of stone dust shall not be less than 1.80.

#### **M-8. Stone Grit**

8.1. Grit shall consist of crushed or broken stone and be hard, strong, dense, durable, clean of proper gradation and free from skin or coating likely to prevent proper adhesion of mortar. Grit shall generally be cubical in shape and as far as possible flakey elongated pieces shall be avoided. It shall generally comply with the provisions of I.S. 383-1970. Unless special stone of particular quarries is mentioned, grit shall be obtained from the best black trap or equivalent hard stone as approved by the Engineer-in-charge. The grit shall have no deleterious with cement.

8.2. The Grit shall conform to the following gradation as per sieve analysis :

I.S. Sieve Designation	Percentage Passing through sieve	I.S. Sieve Designation	Percentage by Weight Passing through Sieve
4.75 mm	100	600 Micron	40 - 85
2.36 mm	100	300 Micron	5 - 50
1.18 mm	70 - 100	150 Micron	0 - 10

8.3. The crushing strength of grit will be such as to allow the concrete in which it is used to built up the specified strength of concrete.

8.4. The necessary tests for grit shall be carried out as per the requirements of I.S.2386 (Parts I to VIII) 1963 as per instructions of the Engineer-in-charge. The necessity of test will be decided by the Engineer-in-charge.

#### **M-9. Cinder**

9.1. Cinder is will burnt furnace residue which has been fused or sintered into lumps of varying sizes.

9.2. Cinder aggregates shall be well burnt furnace residue obtained from furnace using coal fuel only. It shall be sound, clean and free from clay, dirt, ash or other deleterious matter.

9.3. The average grading for under aggregates shall be as mentioned below :

I.S. Sieve Designation	Percentage Passing	I.S. Sieve Designation	Percentage Passing
20 mm	100	4.75 mm	70
10 mm	86	2.36 mm	32

#### **M-10 Lime Mortar**

10.1. Lime shall conform to specification M-2. Water shall conform to specification M-1.

Sand shall conform to specification M-6.

##### **10.2. Proportion of Mix:**

10.2.1. Mortar shall consist of such proportions of slaked lime and sand as may be specified in item. The slaked lime and sand shall be measured by volume.

##### **10.3. Preparation of mortar:**

10.3.1. Lime mortar shall be prepared by wet process as per I S 1625-1971. Power driven mill shall be used for preparation of lime mortar. The slaked lime shall be placed in the mill in an even layer and ground for 180 revolutions with a sufficient water. Water shall be added as required during grinding (care being taken not to add more water) that will bring the mixed material to a consistency of stiff.



paste. Thoroughly wetted sand shall then be added evenly and the mixture ground for another 180 revolutions.

**10.4. Storage:**

**10.4.1.** Mortar shall always be kept damp, protected from sun and rain till used up, covering it by tarpaulin or open sheds.

**10.5. Use:**

**10.5.1.** All mortar shall be used as soon as possible after grinding. It should be used on the day on which it prepared, But in no case mortar made earlier than 36 hours shall be permitted for use.

**M-11. Cement Mortar**

**11.1.** Water shall conform to specification M-1. Cement shall conform to specifications M-3 and Sand shall conform to M-6

**11.2. Proportion of Mix**

**11.2.1.** Cement and sand shall be mixed to specified proportion, sand being measured by measuring boxes, the proportion of cement will be by volume on the basis of 50 Kg/Bag of cement being equal to 0.0342 cu.m. The mortar may be hand mixed or machine mixed as directed.

**11.3. Preparation of Mortar :**

**11.3.1.** In hand mixed mortar, cement and 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 colour is obtained. Mixing platform shall be so arranged that no deleterious extraneous material shall get mixed with mortar or mortar shall flow out. While mixing, the water shall be gradually added and thoroughly mixed to form a stiff plastic mass of uniform colour so that each particle of sand shall be completely covered with a film of wet cement. The water cement ratio shall be adopted as directed

**11.3.2.** The mortar so prepared shall be used within 30 minutes of adding water. Only such quantity of mortar shall be prepared as can be used within 30 minutes.

**M-12. Stone Coarse Aggregate for Nominal Mix Concrete**

**12.1.** Coarse aggregate shall be of machine crushed stone of black trap or equivalent and be hard strong, dense, durable, clean and free from skin and coating likely to prevent proper adhesion of mortar.

**12.2.** The aggregate shall generally be cubical in shape unless special stones of particular quarries are mentioned aggregates shall be machine crushed from the best black trap or equivalent hard stone as approved. Aggregate shall have no deleterious reaction with cement. The size of the coarse aggregate for plain cement and ordinary reinforced cement concrete shall generally be as per the table given below.

However in case of reinforced cement concrete the maximum limit may be restricted to 6 mm. less than the minimum lateral clear distance between bars or 6- mm. less than the cover whichever is smaller.

**TABLE**

I.S. Sieve Designation	Percentage passing for single sized aggregates of Nominal size			I.S. Sieve Designation	Percentage passing for single sized aggregates of Nominal size		
	40 mm	20 mm	16 mm		40 mm	20 mm	16 mm
80 mm	-	-	-	12.5 mm	-	-	-
63 mm	100	-	-	10 mm	0.5	0.02	0.30
40 mm	85-100	100	-	4.75 mm	-	0.5	0.5
20 mm	0-20	85-100	100	2.35 mm	-	-	-
16 mm	-	-	85-100				

**Note :** This percentage may be varied somewhat by the Engineer-in-charge when considered necessary for obtaining better density and strength of concrete.

**12.3.** The grading test shall be taken in the beginning and at the change of source of materials. The necessary tests, indicated in I.S. 383-1970 and 456-1971 shall have to be carried out to ensure the acceptability. The aggregates shall be stored separately and handled in such a manner as to prevent the intermixing of different aggregates. If the aggregates are covered with dust, they shall be washed with water to make them clean. .

**M-13. Black Trap or Equivalent Hard Stone Coarse**

- 13.1. Aggregate For Design Mix Concrete :** Coarse aggregate shall be of machine crushed stone of black trap or equivalent hard stone and be hard, strong, dense, durable, clean and free from skin and coating likely to prevent proper adhesion of mortar.
- 13.2.** The aggregates shall generally be cubical in shape. Unless special stones of particular quarries are mentioned, aggregates shall be machine crushed, from the best, black trap or equivalent hard stones as approved, Aggregate shall have no deleterious with cement
- 13.3.** The necessary tests indicated in I S. 383-1970 and I.S.456-1978 shall have to be carried out to ensure the acceptability of the material.
- 13.4.** If aggregate is covered with dust it shall be washed with water to make it clean.

**M-14. Brick Bats Aggregate**

- 14.1.** Brick bat aggregate shall be broken from well burnt or slightly over burnt and dense bricks. It shall be homogeneous in texture, roughly cubical in shape, clean and free from dirt of any other foreign material. The brick bats shall be of 40 mm - 50 mm. size unless otherwise specified in the item. The under burnt or over burnt brick bats shall not be allowed.
- 14.2** The brick bats shall be measured by suitable boxes or as directed.

**M-15. Bricks**

- 15.1.** The bricks shall be hand or machine molded and made from suitable soils and kiln burnt. They shall be free from cracks and flaws and nodules of free lime they shall have smooth rectangular faces with sharp corners and shall be of uniform colour.  
The bricks shall be moulded with a frog of 100 mm. x 40 mm. and 10 mm. to 20 mm. deep on one of its flat sides. The bricks shall not break when thrown on the ground from a height of 600 mm.
- 15.2.** The size of modular bricks shall be 190 mm.x 90 mm.x 90 mm.
- 15.3.** The size of the conventional bricks shall be as under :  
( 9" x 4.3/8" x 2,3/4" ) 225 x 110 x 75 mm.
- 15.4.** Only bricks of one standard size shall be used on one work. The following tolerances shall be permitted in the conventional size adopted in a particular work.  
Length + 1/8" ( 3.0 mm.) Width  $\pm$  1/16" ( 1.50 mm. ) Height + 1/16" ( 1.50 mm. )
- 15.5.** The crushing strength of the bricks shall not be less than 35 Kg/Sq. Cm. The average water absorption shall not be more the 20 percent by weight Necessary tests for crushing strength and water absorption etc. shall be carried out as per I.S. 3495 ( Part-I to IV ) - 1976

**M-16. Stone**

- 16.1.** The stone shall be of the specified variety such as Granite/Trap Stone/ Quartzite or any other type of good hard stones. The stones shall be only from the approved quarry and shall be hard sound, durable and free from defects like cavities, cracks, sand holes, flaws injurious veins, patches of loose or soft materials etc. and weathered portions and other structural defects Or imperfections tending to affect their soundness and strength. The stone with round surface shall not be used. The percentage of water absorption shall not be more than 5% of dry weight. When tested in accordance with I.S. 1124-1974. The minimum crushing strength of stone shall be 200 Kg/.Sq. Cm. unless otherwise specified.

- 16.2.** The samples of the stone to be used shall be got approved before the work is started
- 16.3.** The Khanki facing stone shall be dressed by chisel as specified in the item for khanki facing in required shape and size. The face of the stone shall be-so dressed that the bushing on the exposed face shall not project by more than 40 mm. from the general wall surface and on face to be plastered it shall not project by more than 19 mm. nor shall it have depressions more than 10 mm. from the average wall surface.

**M-17. Laterite Stone**

- 17.1.** Laterite stone shall be obtained from the approved quarry it shall be compacted in texture sound, durable and free from soft patch. It shall have minimum crushing strength of 100 Kg/Sq. Cm. in its dry condition. It shall not absorb water more than 20% of its own weight, when immersed for 24 hours in water. After quarrying, the stone shall be allowed to weather for some time before using in work.
- 17.2.** The stone shall be dressed into regular rectangular blocks so that all faces are free from waviness and unevenness, and the edges true and square
- 17.3.** Those types of stone in which white clay occurs should not be used
- 17.4.** Special corner stones shall be provided where so directed.

**M-18. Mild Steel Bars**

- 18.1.** Mild steel bars reinforcement for R.C C. work shall conform to I.S. 432 (Part -II) 1966 and shall be of tested quality. It shall also comply with relevant part of I.S. 456-1978.
- 18.2.** All the reinforcement shall be clean and free from dirt, paint, grease, mill scale or loose or thick rust at the time of placing
- 18.3.** For the purpose of payment, the bar shall be measured correct up to 10 mm. length and weight payable worked out at the rate specified below :

1.	6 mm	0.22 Kg./Rmt.	8.	20 mm.	2.47 Kg/Rmt.
2.	8 mm	0.39 Kg./Rmt.	9.	22 mm.	2.98 Kg/Rmt.
3.	10 mm	0.62 Kg./Rmt.	10.	25 mm.	3.85 Kg/Rmt.
4.	12 mm	0.89 Kg./Rmt.	11.	28 mm.	4.83 Kg/Rmt.
5.	14 mm	1.21 Kg./Rmt.	12.	32 mm.	6.31 Kg/Rmt.
6.	16 mm	1.58 Kg./Rmt.	13.	36 mm.	7.99 Kg/Rmt.
7.	18 mm	2.00 Kg./Rmt.	14.	40 mm.	9.86 Kg/Rmt.

**M-19. High Yield Strength Steel Deformed Bars**

- 19.1.** High yield strength steel deformed bars shall be either cold twisted other rolled and shall conform to I.S. 1786-1966 and I.S. 1139-1966 respectively.
- 19.2.** Other provisions and requirements shall conform to specification No. M-18 for Mild Steel Bars.

**M-20. High Tensile Steel Wires**

- 20.1.** The high tensile wires for use in pre stressed concrete work shall conform to I.S.,2090-1962.
- 20.2.** The tensile strength of the high tensile steel bars shall be as specified in the item. In absence of the given strength the minimum strength shall be taken as per Para 6-1 of the I.S. 1785-1962. Testing shall be done as per I.S. requirements.

**20.3.** The high tensile steel shall be free from loose mill scale, rust, oil, grease, or any other harmful matter. Cleaning of steel bars may be carried out by immersion in solvent solution, wire brushing or passing through a pressure box containing Carborundum.

**20.4.** The high tensile wire shall be obtained from manufacturers. in coils having diameter not less than 350 times the diameter of wire itself so that wire springs back straight on being uncoiled .

**M-21. Mild Steel Binding Wire**

**21.1.** The mild steel wire shall be of 1.63 mm. or 1.22 mm. ( 16 to 18 gauge ) diameter and shall conform to I.S. 280-1972.

**21.2.** The use of black wire will be permitted for binding reinforcement bars. It shall be free from rust oil paint, grease loose mill scale or any other undesirable coating which may prevent adhesion of cement mortar.

**M-22. Structural Steel**

**22.1.** All structural Steel shall conform to I S. 226-1985: The steel shall be free from the defects mentioned in I.S 226-1975 and shall have a smooth finish. The material shall be free from loose mill scale, rust pits or other defects affecting the strength and durability. River bars shall conform to I.S. 1148-1973.

**22.2.** When the steel is supplied by the Contractor test certificate of the manufacturers shall be obtained according to I.S. 226-1975 and other relevant Indian Standards.

**M-23. Galvanised Iron Sheets**

**23.1.** The galvanised iron sheets shall be plain or corrugated sheets of gauges as specified in item The G.I. Sheets shall conform to I.S.277-1977. The sheets shall be undamaged in carnage and handling either by rubbing off of zinc coating or otherwise. They shall have clean and bright surface and shall be free from dents, bends, holes, rust or white powdery deposit.

**23.2.** The length and width of G.I. sheets shall be as directed as per site condition.

**M-23.A : G.I. Valleys gutter, ridges**

**23.A.1.** The G.I. ridges and hips shall be of plain galvanised sheets Class - 3 of the thickness as specified in item. These shall be 600 mm. in width and properly bent up to shape without damage to the sheets in process of bending.

**23.A.2.** Valleys gutters and flashings shall also be of galvanised sheet of thickness as specified in item Valleys Shall be 900 mm. wide overall and flashing shall be 380 mm. wide overall They shall be bent to the required shape without damage to the sheet in the process of bending.

**M-24. Asbestos Cement Sheets**

**24.1.** Asbestos cement sheets plain, corrugated or semi-corrugated shall conform to I.S.459-1970 The thickness of the sheets shall be as specified in the item. The sheets shall be free from all defects such as cracks, holes, deformities chipped edges or otherwise damaged.

**24.2. Ridges & Hips :**

**24.2.1.** Ridges and hips shall be of same thickness as that of A.C. sheets. The types, of ridges shall be suitable for the type of sheets and location.

**24.2.2.** Other accessories to be used in roof such as flashing pieces eaves filler pieces, valley gutters, north light, and ventilator curves, barge boards etc, shall be of standard manufacture and shall be suitable for the type of sheets and location.

**M-25. Manglore Pattern Roof Tiles**

- 25.1. The mangalore pattern tiles shall conform to I S 654-1972 for Class AA or Class A type as specified in item. Samples of the tiles to be provided shall be got approved from the Engineer-in-charge. Necessary tests shall be carried out as directed.

**M-26. Shuttering**

- 26.1. The shuttering shall be either of wooden planking of 30 mm. minimum thickness with or without steel lining or of steel plates stiffened by steel angles The shuttering shall be supported on battens and beams and props of vertical bullies properly cross braced together so as to make the centering rigid. In places of bullies props, brick pillar of adequate section built in mud mortar may be used.
- 26.2. The form work shall be sufficiently strong and shall have camber so that it assumes correct shape after deposition of the concrete and shall be able to resist forces caused by vibration of live load of men working over it and other incidental loads associated with it. The shuttering shall have smooth and even surface and its joints shall permit leakage of cement grout.
- 26.3. If at any stage of work during or after placing concrete in the structure, the form work sags or bulges out beyond the required shape of the structure, the concrete shall be removed and work redone with fresh concrete and adequately rigid form work The complete form work shall be got inspected by and got approved from the Engineer-in charge, before the reinforcement bars are placed in position.
- 26.4. The props shall consist of bullies having 100 mm .minimum diameter measured at mid length and 80 mm. at thin end shall be placed as per design requirement. These shall rest squarely on wooden sole plates 40 mm. thick and minimum bearing area of 0-10 sq.m laid on sufficiently hard base.
- 26.5. Double wedges shall further be provided between the sole plate and the wooden props so as to facilitate tightening and easing of shuttering without jerking the concrete
- 26.6. The timber used in shuttering shall not be so dry as to absorb water from concrete and swell or bulge nor so green or wet as to shrink after erection. The timber shall be properly sawn and planed on the sides and the surface coming in contact with concrete wooden form work with metal sheet lining or steel plates stiffened by steel angles shall be permitted
- 26.7. As far as practicable, clamps shall be used to hold the forms together and use of nails and spikes avoided.
- 26.8. The surface of timber shuttering that would come in contact with concrete shall be well wetted and coated with soap solution before the concreting is done Alternatively coat of raw linseed oil or oil of approved manufacture may be applied in place of soap solution In case of steel shuttering either soap solution or raw linseed oil shall be applied after thoroughly cleaning the surface. Under no circumstances black or burnt oil shall be permitted.
- 26.9. The shuttering for beams and slabs shall have camber of 4 mm per meter ( 1 in 250 ) or as directed by the Engineer-in-charge so as to offset the subsequent deflection For cantilevers, the camber at free end shall be 1/50 of the projected length or as directed by the Engineer-in-charge.

**M- 27. Expansion Joints - Permoulded filler**

- 27.1. The item provides for expansion joints in R.C C. frame structures for internal joints, as well as exposed joints, with the use of promoulded bituminous joint filler.

**27.2.** Premoulded bituminous joints filler i.e. performed strip of expansion joints filler shall not get deformed, or broken by twisting bending or other handling when exposed to atmospheric condition. Pieces of joints filler that have been damaged shall be rejected

**27.3.** Thickness of the per-moulded joints filler shall be 25 mm. unless otherwise specified.

**27.4.** Premoulded bituminous joints filler shall conform to I S 1838-1961

**M-28. Expansion joints-Copper strips & hold .fasts**

**28.1.** The item provide for expansion joints in R.C.C. frame structure for internal joints, as well as exposed joints, with the use of premoulded bituminous joints filler.

**28.2.** Copper sheet shall be of 1.25 mm. width and or 1 25 mm. width and the " U " shape in the middle. Copper strip shall have holdfast of 3 mm diameter copper rod fixed to the plate soldered on strip at intervals of about 30 cm or as shown in the drawing or as directed. The width of each flange ( horizontal side ) of the copper plate Jo be embedded in the concrete work shall be 25 mm depth of "U" to be provided in the expansion joint, in the copper plate shall be of 25 mm.

**M-29. Teak wood**

**29.1.** The teak wood shall be of good quality as required for the item to be executed. When the kind of wood is not specifically mentioned, good Indian teak wood as approved shall be used.

**29.2.** Teak wood shall generally be free from large, loose dead or cluster knots, flaws, shakes, warps, twists, bends or any other defects. It shall generally be uniform in substance and of straight fibers as far as possible. It shall be free from rot decay, harmful fungi and other defects of harmful nature which will affect the strength, durability or its usefulness for the purpose for which it is required. The colour shall be uniform as for as possible. Any effort like paining using any adhesive materials made to hide the defects shall render the pieces liable to rejection by the Engineer-in-charge.

**29.3.** All scantlings, planks etc. shall be sawn in straight lines and planes in the direction of grains and of uniform thickness.

**29.4.** The tolerances in the dimensions shall be allowed at the rate of 1.5 mm per face to be planed.

**29.5. First class teak wood**

**29.5.1.** First class teak wood shall have no individual hard and-sound knots, more than 6 sq. cm. in size and the aggregate area of such knots shall not be more than 1% of area of piece, The timber shall be closed grained.

**29.6. Second Class Teak Wood:**

**29.6.1.** No individual hard and sound knots shall be more than 15 sq. cms. in size and aggregates area of such knots shall be not exceed 2% of the area of piece.

**M-29. A Non-teak wood:**

The non-teak wood shall be chemically treated, seasoned as per I.S. Specifications and of good quality. The type of wood shall be got approved before collecting the same on site Fabrication of wooden members shall be started only after approval. For this purpose wood of Bio, Kalai, Sires. Saded, Behda, Jamun, Sisoo will be used for door where as only Kalai. Sires, Halda. Kalam etc. will be permitted for shutters after proper seasoning and chemical treatment.

The non-teak wood shall be free from large loose dead of cluster knots, flows, shakes, warps, bends or any other defects, It shall be uniform in substance and of straight fibers as far as possible It shall be

free from rots, decay, harmful fungi and other defects of nature which will effect the strength, durability or its usefulness for the purpose for which it is required. The colour of wood shall be uniform as far as possible. The scantlings planks etc. shall be saw in straight lines and planes in the direction of grain and of uniform thickness. The department will use the Agency to produce certificate from Forest Department in event of dispute and the decision of the Department shall be final and binding to the contractor. The tolerance in the dimension shall be allowed at 1.5 mm. per face to be planed.

**M-30. Wooden flush door shutters ( solid core )**

- 30.1.** The solid core type flush door shutters shall be of decorative or non-decorative type as specified in the drawing. The size and thickness of the shutter shall be as specified in drawings or as directed. The timber species for core shall be used as per I.S.2202 ( part -I ) 1980. The timber shall be free from decay and insect attack Knots and knot holes less than half the width of cross-section of the members in which they occur may be permitted. Pitch pockets, pitch streaks and harmless pin holes shall be permissible except in the exposed edges of the core members. The commercial plywood, cross-bands shall conform to I.S. 303-1275.
- 30.2.** The face panel of the shutters shall be formed by gluing by the hot press process on both faces of the core with either plywood or cross-bands and face veneers. The1 hopping, rebating. opening of glazing, venation etc., shall be provided if specified in the drawing.
- 30.3.** All edges of the door shutters shall be square. The shutters shall be free from twist or warp in its plane. Both faces of the shutters shall be sand papered to smooth even texture.
- 30.4.** The shutters shall be tested for-
- (1) End immersion test:** The test shall be carried out as per I.S.2202 ( part-1 ) 1980 There shall be no delamination at the end of the test.
- (2) Knife Test :** The face panel when tested in accordance with I.S 1659-1979 shall pass the test.
- (3) Glue adhesion test :** The flush door shall be tested for glue adhesive test in accordance with I S 2202 ( part -I ) 1980. The shutters shall be considered to have passed the test, if no delamination occurs in the glue lines in the plywood and if no single determination more than 80 mm in length and more than 3 mm in depth has occurred in the assembly glue lines between the plywood face and the style and rail. Delamination at the corner shall be measured continuously around the corner Delamination at the knots, knot hole and other permissible wood defects shall not be considered in assessing the sample.
- 30.5.** The tolerance in size of scud core type flush door shall be as under :  
In Nominal thickness  $\pm 1.2$  mm. In Nominal height  $\pm 3$ m
- 30.6.** The thickness of the shutter shall be uniform throughout with a permissible variation of not more than 0.8 mm. when measured at any points.

**M-31. Aluminum doors, windows, ventilators**

- 31.1.** Aluminum alloy used in the manufacture of extruded window sections shall conform to I.S. designation HEAWP of I.S. 733-1975 and also to I S. Designation WVG-WP of I.S 1285-1975 The section shall be as specified in the drawing and design. The fabrication shall be done as directed
- 31.2.** The hinges shall be cast or extruded aluminum hinges of same type as in window but of larger size.
- 31.3.** The hinges shall normally be of 50 mm. projecting type. Non-projecting type of hinges may also be used if directed. The handles of door shall be of specified design A suitable lock for the door Operable either



from outside or inside shall be provided. In double shutter door, the first closing shutter shall have concealed aluminum alloy bolt at top and bottom.

**M-32. Rolling Shutters**

- 32.1.** The rolling shutters shall conform to I.S.6248-1979 Rolling shutters shall be supplied of specified type with accessories. The size of the rolling shutters shall be specified in the drawings. The shutters shall be specified in the drawings. The shutters shall be constructed with interlocking lath sections formed from cold rolled steel strips not less than 0.9 mm. thick and 80 mm. wide for shutters up to 3.5 m .width not less than 1.25 mm. thick and 80 mm wide for shutters 3.5 m. in width and above unless otherwise specified.
- 32.2.** Guide channels shall be of mild steel deep channel section and of rolled pressed or built up (fabricated) joint less construction The thickness of sheet used shall not be less than 3.15 mm.
- 32.3.** Hood covers shall be made of M S. Sheets not less than 0.90 mm. thick. For shutters having width 3.5 Meter and above, the thickness of M.S. sheet for the hood cover shall be not less than 1 25 mm.
- 32.4.** The spring shall be of best quality and shall be manufactured from tested high tensile spring steel wire of strip of adequate strength to balance the shutters in all position. The spring pipe shaft etc. shall be supported on strong M S of malleable C I. brackets. The brackets shall be fixed on or under the lintel as specified with raw plugs and screws bolts etc.
- 32.5.** The rolling shutters shall be of self rolling up to 8 Sq. m. clear area without ball bearing and up to 12 Sq.m. clear area with ball bearing. If the rolling shutters are of larger, then gear operated type shutters shall be used.
- 32.6.** The locking arrangement shall be provided at the bottom of shutter at both ends The shutters shall be opened from outside.
- 32.7.** The Shutters shall be completed with door suspension shafts, looking arrangements, pulling hooks, handles and other accessories.

**M-33. Collapsible Steel Gate**

- 33.1.** The collapsible steel gate shall be in one or two leaves and size as per approved drawings or as specified. The gate shall be fabricated from best quality mild steel channels, flats etc. Either steel pulleys or ball-bearings shall be provided in every double channel Unless otherwise specified the particulars of collapsible gate shall be as under.
- (a) Pickets : These shall be of 20 mm. M.S. channels of heavy sections unless otherwise shown on drawings. The distance centre to centre of pickets shall be 12 cms .with an opening or 10 Cms
- (b) Pivoted M.S. flats shall be 20 mm x6 mm
- (c) Top and bottom guides shall be from tee of flat iron of approved size.
- (d) The fittings like stoppers fixing, locking cleats, brass handles and cast iron rollers shall be of approved design and size

**M-34. Welded Steel Wire Fabric**

- 34.1** Welded steel wire fabric for general purpose shall be manufactured form cold drawn steel wire "as drawn" or galvenised steel conforming to I.S. 226-1975 with longitudinal and transverse wire securely connected at every intersection by a process of electrical resistance welding and conforming to I.S.4948-1974. it shall be fabricated and finished in workmanlike manner and shall be free from injurious

defects and shall be rust proof The type of mesh shall be oblong or square as directed The mesh sizes and sizes if wire for square 3b well as oblong welded steel wire fabric shall be as directed The steel wire fabric in panels shall be in one whole piece in each panel as far as stock sizes permit.

**M-35 Expanded Metal Sheets**

**35.1.** The expanded metal sheets shall be free from flaws joints broken strands laminations and other harmful surface defects. Expanded metal steel sheet shall conform to IS-412-1975. except that blank sheets need not be with guaranteed mechanical properties The size of the diamond mesh of expanded metal and dimensions of strands (width and thickness) shall be as specified. The tolerance on nominal weight of expanded metal sheets shall be of + 10 percent.

**35.2.** Expanded metal in panels shall be in one whole piece in each panel as far as stock sizes permit. The expanded metal sheets shall be coated with suitable protective coating to prevent corrosion.

**M-36. Mild Steel Wire ( Wire Gauze Jali )**

**36.1.** Mild steel wire may be galvanized as indicated. All finished steel wire shall be well cleanly drawn to the dimensions and size of wire as specified in item. The wire shall be sound free from splits surface flaws, rough jagged and imperfect edges and other harmful surface defects and shall conform to I.S. 280-1978.

**M-37. Plywood**

**37.1.** The plywood for general purpose shall conform I.S. 303-17-1975.

Plywood is made by cementing together than boards or starts of wood into panels. There are always an odd number of layers, 3,5,7,9, ply etc. The piles are placed so that grain of each layer is at right angles to the grain in the adjacent level.

**37.2.** The chief advantages of plywood a single board of the same thickness is the more uniform strength of the plywood, along the length and width of the plywood and greater resistance to cracking and splitting with change in moisture content.

**37.3.** Usually synthetic resins are used to gluing, phenolic resins are usually cured in a hot press which compresses and simultaneously heats the plies between hot plates which maintain a temperature of 90 degree C to 140 degree C and a pressure of 11 to 14 Kg/ Sq. Cm on the wood. The time of heating may be anything from 2 to 60 minutes depending upon thickness

**37.4.** When water glue are used the wood absorbs so much water that the finished plywood must be dried carefully. When synthetic resins are used as adhesive the finished plywood must be exposed to an atmosphere of controlled humidity until the proper amount of moisture has been absorbed.

**37.5.** According to I.S. 303-1975 the plywood for general purpose shall be of the grades namely BWR, WWR and CWR depending up to the adhesives used for bonding the veneers and it will be further classified into six types namely AA, AB, AC, BB, BC and CC based on the quality of the two faces each face being of three kinds namely A, Band C After pressing, the finished plywood should be reconditioned to a moisture content not less than 8 percent and not more than 16 percent.

**37.6.** Thickness of plywood Boards

Board	Thickness	Board	Thickness	Board	Thickness	Board	Thickness
3 Ply	3 mm	5 Ply	5 mm	7 Ply	9 mm	9 Ply	16 mm
	4 mm		6 mm		13 mm		19 mm
	5 mm		8 mm		16 mm	11 Ply	19 mm

	6 mm		9 mm	9 Ply	13 mm		25 mm
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#### **M-38. Glass**

**38.1.** All glass shall be of the brief quality, free from specks, bubbles, smokes veins, air holes blisters and other defects. The kind of glass to be used shall be as mentioned in the item or specification or in the special provision or as shown in detailed drawings. Thickness of glass panes shall be uniform. The specifications for different kinds of glass shall be as under.

#### **38.2. Sheet Glass**

**38.2.1.** In absence of any specified thickness or weight in the item or detailed specifications of the item of work, sheet glass shall be weighing 7.5 Kg/Sq. m for panes up to 600 mm x 600 mm.

**38.2.2.** For panes larger than 600 mm x 600 mm and up to 800 mm x 800 mm the glass weighing not less than 8.75 Kg/Sq m shall be used for bigger panes up to 900 mm x 900 mm. glass weighing not less than 8.75 Kg/Sq. m shall be used. For bigger panes up to 900 mm x 900 mm. glass weighting not less than 11.25 Kg/Sq. m. shall be used

**38.2.3.** Sheet glass shall be patent flattened glass of best quality and for glazing and framing purposes shall conform to I.S. 1761-1960. Sheet glass of the specified colours shall be used, if so shown, on detailed drawings or so specified For important buildings and for panes with any dimension over 900 mm plate glass of specified thickness shall be used

#### **38.3. Plate Glass:**

**38.3.1.** When plate glass is specified it shall be "polished patent plate glass" of best quality It shall have both the surface ground flat and parallel and polished to obtain clear undisturbed vision and reflection The plate glass shall be of the thickness mentioned in the item or as shown in the detailed drawing or as specified. In absence of any specified thickness, the thickness of plate glass to be supplied shall be 6 mm. and a tolerance of 0.20 mm shall be admissible

#### **38.4. Obscured Glass:**

**38.4.1.** This type of glass transmits light so that vision is partially or almost completely obscured. Glass shall be plain rolled, figured, ribbed or fluted, or frosted glass as may be specified as required. The thickness and type of glass shall be as per details on drawings or as specified or as directed

#### **38.5. Wired Glass:**

**38.5.1.** Glass shall be with wire netting embedded in a sheet of planet glass. Electrically welded 13 mm Georgian square mesh shall be used Thickness of glass shall not be less than 6 mm Wired glass shall be of type and thickness as specified

#### **M-39. Acrylic Sheets**

**39.1.** Acrylic sheets shall be of thickness as specified in the item and of an specified shape and size as the case may be panels may be flat or curved It should be light in weight it shall be colourless or coloured or opaque as specified in the item. Colourless sheet shall be as transparent as the finest optical glass. Its light transmission rate shall be about 95% Transparency shall not be affected for the sheets of larger thickens, it shall be extremely resistant to sunlight weather and low temperatures. It shall not sow any significant yellowing or change in physical properties or loss of light transmission over a longer period of use. The sheet shall be impact resistant also Sheets should be of such quality that they can be cut, bent jointed as desired Solution for the joints shall be used as per the requirement of manufacturer.

**M-40. Particle board**

- 40.1.** The particle boards used for face panels shall be of best quality free from any defects. The particle boards shall be made with phenolmaldehyde adhesive. The particle boards shall conform to IS 3087-1905 "Specification for wood particle board for general purpose". The size and the thickness shall be as indicated.

**M-41. Expanded polystyrene or framed styrofoam slabs**

- 41.1.** The expanded polystyrene ceiling boards and tiles shall be of approved make and shall be of sizes, thickness, finish and colour as indicated. It shall be of high density and suitable for use as insulating material. The insulating material shall be like slabs of Thermocole etc.

**M-42. Resin bonded fiber glass.**

- 42.1.** The resin bonded fiber glass tiles or rolls shall be of approved make and shall be of sizes, thickness and finish as indicated.
- 42.2.** For test of Mineral wool thermal insulation [Blanket IS 3144-1965 shall be followed]
- 42.3.** Insulation wool blanks shall be with the following coverings on one or both sides as indicated
- (1) Bituminous Hessian Kraft paper suitable for use in position where moisture has to be excluded.
  - (2) Hessian cloth or Kraft paper for keeping out dust
  - (3) G.I wire netting, suitable for surfaces to be plaster over

**M-43. Fixtures and fastenings**

**43.1. General:**

- 43.1.1.** The fixtures and fastenings, that is butt hinges, tee and strap hinges, sliding door bolts, tower bolts, door latch, bath-room latch, handles, door stoppers, casement window fasteners, casement stays and ventilators, catch shall be made of the metal as specified in the item or its specification.
- 43.1.2.** They shall be of iron, brass, aluminum, chromium plated iron, chromium plated brass, copper oxidised iron, copper oxidised brass or anodised aluminum as specified.
- 43.1.3.** The fixtures shall be heavy, medium or light type. The fixtures and fastenings shall be smooth finished and shall be such as will ensure ease of operations.
- 43.1.4.** The samples of fixtures and fastenings shall be got approved as regards, quality and shape before providing them in position.
- 43.1.5.** Brass and anodised aluminium fixtures and fastenings shall be bright finished.

**43.2. Holdfasts:**

- 43.2.1.** Holdfasts shall be made from mild steel flat 30 cm length and one of the holdfasts shall be bent at right angle and two nos. of 6 mm. diameter holes shall be made in it for fixing it to the frame with screws. At the other end, the holdfast shall be forked and bent at right angles in opposite directions.

**43.3. Butt hinges:**

- 43.3.1.** Railway standard heavy type butt hinges shall be used when so specified.
- 43.3.2.** Tee and strap hinges shall be manufactured from MS Sheet.

**43.4. Sliding door bolts (Aldrops):**

- 43.4.1.** The aldrops as specified in the item shall be used and shall be got approved.

**43.5. Tower bolts (Barrel Type):**

- 43.5.1.** Tower bolts as specified in the item shall be used and shall be got approved.

**43.6. Door Latch:**

**43.6.1.** The size of door latch shall be taken as the length of latch.

**43.7. Bathroom Latch:**

**43.7.1.** Bathroom latch shall be similar to tower bolt.

**43.8. Handle:**

The size of the handles shall be determined by the inside grip length of the handles. Handles shall have a base plate of length 50 mm. more than the size" of the handle.

**43.9. Door Catch:**

**43.9.1.** Door stoppers shall be either floor door stopper type or door catch type Floor stopper shall be of overall size as specified and-shall have a rubber cushion.

**43.10. Door Stoppers:**

**43.10.1.** Door catch shall be fixed at a height to about 900 mm from the floor level such that one part of the catch is fitted on the inside of the shutter and the other part is fixed in the wall with necessary wooden plug arrangements for appropriate fixity The catch shall be fixed 20 mm inside the face of the door for easy operation of catch.

**43.11. Wooden Door Stop with hinges:**

**43.11.1.** Wooden door stop of size 100 mm x 40 mm x 40 mm shall be fixed on the door frame with a hinges of 75 mm. size and at a height of 900 mm. from the floor level The wooden door stop shall be provided with 3 coats of approved oil paint

**43.12. Casement Window Fastener:**

**43.12.1.** Casement window fastener for single leaf window shutter shall be left or right handed as directed.

**43.13. Casement stays (Straight Red Stay):**

**43.13.1.** The stays shall be made from a channel section having three holes at appropriate position so that the window can be opened either fully or partially as directed. Size of the stay shall be 250 mm to 300 mm. as directed.

**43.14. Ventilator Catch:**

**43.14.1.** The pattern and shape of the catch shall be as approved

**43.15. Pivot:**

**43.15.1.** The base and socket plate shall be made from minimum 3 mm. thick plate: and projected pivot shall not be less than 12 mm 'diameter and 12 mm. length and shall be firmly riveted to the base plate in case of iron pivot and in single piece plate in the case of brass pivot.

**M-44. Paints:**

**44.1. (A) Oil paints :**

**44.1.1.** Oil paints shall be of the specified colour and as approved. The ready mixed paints shall only be used. However, if ready mixed paint of specified shade or tint is not available white ready mixed paint with approved stainer will be allowed In such a case the contractor shall ensure that the shade of the paint so allowed shall be uniform.

**44.1.2.** All the paints shall meet with the following general requirements.

(i) Paint shall not show excessive setting in a freshly opened full can and shall easily be ready spread with a paddle to a smooth homogeneous state. The paint shall show no curdling, levering caking or colour separation and shall be free from lumps and skins.

(ii) The paint as received shall brush easily, possess good leveling properties and show no running or sagging tendencies.

(iii) The paint shall not skin within 48 hours in a three quarters filled closed container.

(iv) The paint shall dry to a smooth uniform finish free from roughness, grit unevenness and other imperfections.

**44.1.3.** Ready mixed paint shall be used exactly as received from the manufacturers and generally according to their instructions and without any admixtures whatsoever

**44.2. (B) Enamel paints:**

**44.2.1.** The enamel paint shall satisfy in general requirements in specification of oil paints, Enamel paint shall conform to I.S. 2933-1975.

**M-45. French Polish**

**45.1.** The French polish of required tint and shade shall be prepared with the below mentioned ingredients and other necessary materials:

(i) Denatured spirit of approved quality (ii) Chandras (iii) Pigment.

**45.2.** The French polish so prepared shall conform to I S : 348-1 9C8.

**M-46. Marble chips for marble mosaic terrazzo**

**46.1.** The marble chips shall be of approved quality and shades. It shall be hard, sound, dense and homogeneous in texture with crystalline and coarse grains It shall be uniform in colour and free from stains cracks, decay and weathering.

**46.2.** The size of various colours of marble chips ranging from the smallest up to 20 mm shall be used where the thickness of top wearing layer is 6 mm size The marble chips of approved quality and colours only as per grading as decided by the Engineer-in-charge shall be used for marble mosaic tiles or works.

**46.3.** The marble chips shall be machine crushed. They shall be free from foreign matter, dust etc. Except as above, the chips shall conform to I S 2114-1962

**M-47. Flooring Tiles**

**47.1. (A) Plain Cement tiles;**

**47.1.1.** The plain cement tiles shall be of general purpose type. These are the tiles in the manufacture of which no pigments are used. Cement used in the manufacture of tiles shall be as per Indian Standards.

**47.1.2.** The tiles shall be manufactured from a mixture of cement and natural aggregates by pressure process. During manufacture the tiles shall be subjected to pressure of not less than 140 Kg/Sq. Cm. The proportion of cement to aggregate in the backing of the tiles shall be not less than 1 : 3 by weight The wearing face, through the tiles are of plain cement, shall be provided with stone chips of 1 to 2 mm. size. The proportions of cement to aggregate in the wearing layer of the tiles shall be three parts of cement to one parts chips by weight. The minimum thickness of wearing layer shall be 3 mm. The colour and texture of wearing layer shall be uniform throughout its face and thickness. On removal from mould, the tiles shall be kept in moist condition continuously at least for seven days and subsequently, if

necessary, for such long period as would ensure their conformity to requirements of I.S.1237-1980 regarding strength resistance to wear and water absorption.

**47.1.3** The wearing face of the tiles shall be plane, free from projections, depressions and cracks and shall be reasonably parallel to the back face of the tile. All angles shall be right angle and all edges shall be sharp and true.

**47.1.4.** The size of tiles generally be square shapes 24.85 Cm x24.85 Cm. or 25 Cm x 25 Cm The thickness of tiles shall be 20 mm.

**47.1.5.** Tolerance of length and breadth shall be plus or minus one millimeter Tolerance on thickness shall be plus 5mm.

**47.1.6.** The tiles shall satisfy the tests as regards transverse strength, resistance to wear and water absorption as per I.S 1237-1980.

**47.2. (B) Plain Coloured Tiles:**

**47.2.1.** The tiles shall have the same specification as for plain cement tiles as per (A) above expect that they shall have a plain wearing surface wherein pigments are used. They shall conform it I.S. 1237-1980.

**47.2.2.** The pigments used for colouring cement shall not exceed 10 percent by weight of cement used in the mix. The pigments, synthetic or otherwise, used for colouring tiles shall have permanent colour and shall not contain materials detrimental to concrete

**47.2.3** The colour of the tiles shall be specified in the item or as directed

**47.3. (C) Marble mosaic tiles:**

**47.3.1.** These tiles have same specification as per plain cement tiles except the requirements as stated below.

**47.3.2.** The marble mosaic tiles shall conform to I.S 1237-1980. The wearing face of the tiles shall be mechanically ground and filled. The wearing face of tiles shall be free from projections depressions and cracks and shall be reasonably parallel to the back face of the tiles. All angles shall be right angles and all edges shall be sharp and true.

**47.3.3.** Chips used in the tiles be from smallest up to 20 mm. size. The minimum thickness of wearing layer of tiles shall be 6 mm. For pattern of chips to be had on the wearing face; a few samples with or without their full size photographs as directed shall be approved by the Engineer-in-charge, for approval.

**47.3.4.** Any particular samples if found suitable shall be approved by the Engineer-in-charge, or he may ask for a few more samples to be presented The samples shall have to be made by the contractor till a suitable sample is finally approved for use in the work. The Contractor shall ensure that the tiles supplied for, the work shall be in conformity with the approved sample only, in terms of its dimensions, thickness of backing layer and wearing surface, materials, ingredients, colour, shade, chips, distribution etc. required.

**47.3.5.** The tiles shall be prepared from cement conforming to Indian Standards or coloured port land cement generally depending upon the colour of tiles to be used or as directed.

**47.4. (D) Chequered Tiles :**

**47.4.1.** Chequered tiles shall be plain cement tiles or marble mosaic tiles. The former shall have the same specification as per (A) above and the latter as per marble mosaic tiles as per (C) except as mentioned below

**47.4.2.** The tiles shall be of nominal size of 250 mm. x 250 mm. or as specified. The centre to centre distance of chequer shall not be less than 25 mm. and not more than 50 mm. The overall thickness of the tile shall be 22 mm

**47.4.3.** The grooves in the chequers shall be uniform and straight. The depth of the grooves shall not be less than 3 mm. The chequered tiles shall be plain coloured or mosaic as specified The thickness of the upper layer measured from the top of the chequers shall not be less than 6 mm. The tiles shall be given the first grinding with machine before delivery to site.

**47.4.4.** Tiles shall conform or relevant I.S 1237-1980. 47.5.

**47.5. (E) Chequered Tiles For Stair Cases :**

**47.5.1.** The requirements of these tiles shall be the same as chequered tiles as per (D) above except in following respects :

- (1) The length of a tile including nosing shall be 300 mm (2) The minimum thickness shall be 28 mm (3) The nosing shall have also the same wearing layer as at the top. (4) The nosing edge shall be rounded (5) The front portion of the tile for a minimum length of 75 mm. from and including the nosing shall have grooves running parallel to nosing and at centers not exceeding 25 mm Beyond that the tiles shall have normal chequer pattern.

**M-48. Rough Kotah Stone**

**48.1.** The Kotah stones shall be hard even, sound, and regular in shape and generally uniform in colour. The colour of the stone shall generally be green Brown coloured shall not be allowed for use They shall be without any soft veins, cracks or flaws.

**48.2.** The size of the stones to be used for flooring shall be of size 600 mm x 600 mm and/or size 600 mm. x 450 mm as directed However smaller sizes will be allowed to be used to the extent of maintaining required pattern. Thickness shall be as specified

**48.3.** The edges of stones shall be chisel dressed on all accounts of chisel dressing of edges shall be permitted for length as well as breadth. Tolerance in thickness shall be  $\pm 3$  mm

**48.4.** The edges of stones shall be truly chiseled and table rubbed with coarse sand before paving. All angles and edges of the stones shall be true, square and free from chipping and surface shall be true and plain.

**48.5.** When machine cut edges are specified, the exposed and the edges at joints shall be machine cut The thickness of the exposed machine cut edges shall be uniform

**M-49. Polished Kotah Stone**

**49.1.** Polished kotah stone shall have the same specification as per rough kotah stone except as mentioned below :

**49.2.** The stones shall have machine polished surface. When brought on site, the stones shall be single polished or double polished depending upon its use. The stones for paving shall generally be single polished The stones to be used for dado, skirting, sink, veneering, sills steps etc. where machine polishing after the stones are fixed in situ is not possible shall be double polished

**M-50. Dholpur Stone Slab**



- 50.1. Dholpur stone slab shall be of best quality as approved by the Engineer-in-charge. The stone slab shall be without any veins, cracks, and flaws. The stone slab shall be even, sound and durable, regular in shape and of uniform colour.
- 50.2. The size of the stone shall be as specified in the item or detailed drawing or as approved by the Engineer-in-charge. The thickness of the stone shall be as specified in the item of work with the permissible tolerance of plus or minus 2 mm. The provision in respect of polishing as for polished kota stone shall apply to polished Dholpur stone also. All angles and edges of the face of the stone slab shall be finely chiseled or polished as specified in the item of work and all the four edges shall be machine cut. All angles and edges of the stone slab shall be true and plane.
- 50.3. The sample of stone shall be got approved by the Engineer-in-charge for a particular work. It shall be ensured that the stones to be used in a particular work shall not differ much in shade or tint from the approved sample.

**M-51. Marble Slab**

- 51.1. Marble slab shall be white or of other and of best quality as approved by the Engineer-in-charge.
- 51.2. Slabs shall be hard, close, uniform and homogeneous in texture. They shall have even crystalline grain and free from defects and cracks. The surface shall be machine polished to an even and perfect plane surface and edges machine cut true and square. The rear face shall be rough to provide key for the mortar.
- 51.3. Marble slabs with natural veins, if selected, shall have to be laid as per the pattern given by the Engineer-in-charge.  
Size of the slab shall be minimum 460 mm x 450 mm and preferably 600 mm x 600 mm. However, smaller sizes will be allowed to be used on the extent of maintaining required pattern.
- 51.4. The slab shall not be thinner than the specified thickness at its thinnest part. A few specimens of finished slab to be used shall be deposited by the Contractor in the office for reference.
- 51.5. Except as above, the marble slabs shall conform to I.S. 1130-1969.

**M-52. Granite Stone slab**

- 52.1. Granite shall be of approved colour and quality. The stone shall be hard, even, sound and regular in shape and generally uniform in colour. It shall be without any soft veins, cracks or flaws.
- 52.2. The thickness of the stone shall be specified in items.
- 52.3. All exposed faces shall be double polished to tender, truly smooth and even reflecting surface. The exposed edges and corners shall be rounded off as directed. The exposed edges shall be machine cut and shall have uniform thickness.

**M-53. P.V.C. Flooring**

- 53.1. P.V.C. sheets for P.V.C., floor covering shall be of homogeneous flexible type conforming to I S 3462-1966. The P.V.C. covering shall neither develop any toxic effect while put to use nor shall give off any disagreeable odour.
- 53.2. Thickness of flexible type covering tiles shall be as specified in the description of the item.
- 53.3. The flexible type shall be backed with Hessian or other woven fabric. The following tolerances shall be applicable on the nominal dimensions of the rolls or tiles :  
(a) Thickness + 015 mm.

(b) Length or Width

- |                          |            |                         |                 |
|--------------------------|------------|-------------------------|-----------------|
| (1) 300 mm. Square tiles | ± 0.20 mm. | (3) 900 mm Square tiles | ± 0.60 mm.      |
| (2) 600 mm. Square tiles | ± 0.40 mm. | (4) Sheets and roll     | ± 0.10 percent. |

**53.4. Adhesive:**

**53.4.1.** The adhesive for PVC flooring shall be of the type and make recommended by the manufacturers of PVC sheets/tiles.

**M-54. Facing Tiles**

**54.1.** The facing tiles (burnt clay facing bricks) shall be free from cracks, and nodules of free lime. They shall be thoroughly burnt and shall have plane rectangular faces with parallel sides and sharp straight right angled faces. The texture of the finished surface that will be exposed when in place shall conform to an approved sample consisting not less than for stretcher bricks each representing the texture desired. The facing tiles shall have a pleasing appearance, sufficient resistance to penetration by ram and greater durability than common bricks. The tiles shall conform to I.S. 2691-1972.

**54.2.** The standard size of facing brick tiles shall be 19 x 9 x 4 cms. The facing brick tiles shall be provided with frog which shall conform to I.S. 11077-1976.

**54.3.** The permissible tolerance in dimensions specified above shall be as follows:

Size	Tolerance for	
	1st Class Brick	2nd Class Brick
19 cm.	± 6 mm	± 10 mm
9 cm.	± 3 mm	± 7 mm
4 cm.	± 1.5 mm	± 3 mm

**54.4.** The tolerance for distortion or warpage of face or edges of individual brick from a plane surface and from a straight line respectively shall be as follows:

Facing dimensions	Permissible tolerance
Max. below 19 cms.	Max. 2.5 mm
- do - above 19 cm.	Max. 3.0 mm

**54.5.** The average compressive strength obtained as a sample of five tiles when tested in accordance with the procedure laid as per I.S. 1077-1976 shall be not less than 175 Kg/Sq Cm. The average compressive strength of any individual bricks shall be not less than 160 Kg / Sq.Cm.

**54.6.** The average water absorption for five bricks tiles shall not exceed 12 percent of average weight of brick before testing. The absorption for each individual bricks shall not exceed 25 percent.

**54.7.** The brick tiles when tested in accordance with I.S. 1077-1976, the rate of efflorescence shall not be more than "Slightly effloresced"

**M-55. White glazed tiles**

**55.1.** The tiles shall be of best quality as approved by the Engineer-in-charge. They shall be flat and true to shape. They shall be free from cracks, crazing spots chipper) edges and corners. The glazing shall be of uniform shade.

- 55.2.** The tiles shall be nominal size of 150 mm x 150 mm unless otherwise, specified. The maximum variation the stated sizes other than the thickness of tile shall be plus or minus 1.5 mm. The thickness of tile shall be 6 mm. Except as above the tiles shall conform to I.S. 1977-19/0.

**M-56. Galvanised iron pipes and fittings**

- 56.1.** Galvanised iron pipes shall be of the medium type and of required diameter and shall comply with I.S. 1239-1979. The specified diameter of the pipes shall refer to the inside diameter of the bore, clamps, screw and all galvanised iron fittings shall be of the standard 'R' or equivalent make.

**M-57. Bib cock and stop cock**

- 57.1.** A bib cock is a draw off tap with a horizontal inlet and free outlet A stop cock is a valve with suitable means of connection for insertion in a pipe line for controlling or stopping the flow.
- 57.2.** They shall be of screw down type and of brass chromium plated and of diameter as specified in the description of the item. They shall conform to I.S. 781-1977 and they shall be of best Indian make. They shall be polished bright.
- 57.3.** The minimum finished weight of bib cock and stop cock shall be as given below :

Diameter	Bib Cock	Stop Cock	Diameter	Bib Cock	Stop Cock
8 mm	0.25 Kg.	0.25 Kg.	15 mm	0.40 Kg.	0.40 Kg.
10 mm	0.30 Kg.	0.35 Kg.	20 mm	0.75 Kg.	0.75 Kg.

**M-58. Gun metal wheel valve**

- 58.1.** The gun metal wheel valve shall be of approved quality. These shall be of gun metal fitted with wheel and shall be of gate valve opening full way and of the size specified. These shall conform to I.S. 778-1971.

**M-59. White glazed porcelain wash basin**

- 59.1.** Wash basin shall be of white porcelain first quality best Indian make and it shall conform to I.S. 2556 (Part -IV) -1972 and I.S. 771-1979. The size of the wash basin shall be as specified in item. Wash basin shall be of one piece construction with continued over flow arrangements All internal angles shall be designed so as to facilitate cleaning. Wash basin shall have single tap hole as specified. Each basin shall have a circular waste hole which is either riveted or beveled internally with 65 mm. diameter at top and 10 mm. depth to suit the waste fitting. The necessary stud slot to receive the bracket on the under side of the basin shall be provided Basin shall have an internal soap holder which shall fully drain into the bowl.
- 59.2.** White glazed pedestal of the quality and colour as that the basin shall be provided where specified in the item. It shall be completely recessed at the back for reception of supply and wash pipe. It shall be capable of supporting the basin rigidly and adequately and shall be so designed as to make the height from the floor to top of the rim of basin 750 mm. to 800 mm. as directed.

**M-60. European type water closet/with low flushing**

- 60.1.** The European type water closet shall be white glazed porcelain first quality and shall be of wash down type conforming to I.S. 2556-1973 and I.S. 771-1979.
- 60.2.** 'S' trap shall be provided as required with water seal not less than 50 mm. The solid plastic seat and cover shall be of best Indian make conforming to I.S. 2548-1980. They shall be made of moulded synthetic

materials which shall be tough and hard with high resistance to solvents and shall be free from blisters and surface defects and shall have chromium plated brass hinges and rubber buffer of suitable size.

**M-61. Orrissa type water closet**

- 61.1. The Specification of Orrissa type white glazed water closet of first quality shall conform to I.S. 2256 (Part-III) -1981 and relevant specification of Indian type water closet except that pan will be with the integral squatting pan of size 580 mm x 400 mm with raised footrest.

**M-62. Indian type water closet**

- 62.1. The Indian type white glazed water closet of first quality shall be of size as specified in the item and conforming to I.S. 771-1979 and I.S. 2556 – (Part-II) 1981. Each pan shall have integral flushing. It shall also have an inlet at back or front for connecting flush pipes as directed. The inside of the bottom of the pan shall have sufficient slope from the front towards the outlet and surface shall be uniform and smooth. Pan shall be provided with 100 mm. diameter 'P' or 'S' trap with approximately 50 mm. Water seal and 50 mm. diameter vent horn.

**M-62. A. Foot Rests**

- 62.A.1. A pair of white glazed earthen ware rectangular foot to minimum size 250 mm. x 130 mm. x 20 mm shall be provided with the water closet.

**M-63. Glazed Earthen Ware Sink**

- 63.1. The glazed earthen-ware sink shall be of specified size, colour and quality. The sink shall conform, to I.S. 771 Part – II – 1979. The brackets for sinks shall conform to I.S. 775-1970.
- 63.2. The pipes shall conform to I.S. 1239-part-I 1973 and I.S. 404-1962 for steel and lead pipes respectively. 32 mm. brass waste coupling of standard pattern with brass chain and rubble plug shall be provided with sink.

**M-64. Glazed earthen-ware Lipped type flat back urinal/corner type urinal**

- 64.1. The lipped type urinal shall be flat back or corner type as specified in the item and shall conform to I.S. 771-1979. It shall be of best Indian make and size as specified and approved by the Engineer-in-charge. The flat back of corner type urinal must be of 1st quality free from any defects, cracks etc.

**M-65. Low level Enamel flushing tank**

- 65.1. The low level enamel flushing tank shall be of 15 liters capacity. It shall conform to I.S. 774-1971. The flushing cistern shall be of best quality and free from any defects. The flushing tank shall have outlet 32 mm. diameter. The outlet shall be connected with W.C. pan by lead pipe or P.V.C. pipe as specified. The flushing tank shall be provided with inlet and outlet for fixing G.I. inlet pipes and over-flow pipes. The flushing cistern shall be provided with chromium plated handle for flushing. The flushing tank shall be provided with bracket of cast iron so that it can be fixed on wall at specified height. The brackets shall conform to I.S. 775-1970.

**M-66. Cast iron flushing cistern.**

- 66.1. The cast iron flushing cistern shall be of 15 liters capacity. It shall conform to I.S. 774-1971. The flushing cistern shall be of best quality free from any defects. The flushing cistern shall have outlet of 32 mm diameter. The lead pipe shall conform to I.S. 404 (Part-I) - 1962; For fixing G.I. inlet pipes and overflow pipe 20 mm. dia. inlet and outlet shall be provided. The flushing cistern shall be provided with galvanised iron chain and pull of sufficient length and shall be got approved from the Engineer-in-charge. The cast

iron flushing cistern shall be painted with one coat of anticorrosive paint and two coats of paints The flushing cistern shall be fixed on two C I brackets The C I brackets shall conform to I S 775-1970.

**M-67. Flush cock**

**67.1.** Half turn flush cock (Heavy weight) shall be of gun metal chromium plated of diameter as specified in the description of the item. The flush cock shall conform to relevant Indian Standard.

**M-68. Cast iron pipes and fittings.**

**68.1.** All soil water, vent and anti syphonage pipes and fitting shall conform to I S.1729-1964. The pipes shall have spigot and socket ends with head on spigot end. The pipes and fitting shall be true to shape smooth, cylindrical, their inner and outer surfaces being as nearly as practicable concentric. They shall be sound and nicely cast and shall be free from cracks, laps, pinholes or there imperfection and shall be neatly dressed and carefully fettled.

**68.2.** The end of pipes and fittings shall be reasonable square to their axis.

**68.3.** The sand of cast iron pipes shall be of the diameter as specified in the description and shall be in lengths of 1.5 M., 1.8 M. including socket ends of the pipe unless shorter lengths are either specified or required at junctions etc. The pipes and fittings shall be supplied without ears unless specified or directed otherwise.

**68.4. Tolerances :**

**68.4.1.** The Standard weights and thickness of pipes shall be as shown in the following table A tolerance up to minus 10 per cent may however be -allowed against these standard weights

Sr. No.	Nominal dia. of Bore	Thickness	Overall	Weight of Pipe		excluding ears
			1.5 m long	1.8 m long		2 m. long
1.	75 mm	5.0 mm	12.83 Kg.	16.52 Kg.		18.37 Kg.
2.	100 mm	5.0 mm	18.14 Kg.	21.67 Kg.		24.15 Kg.

**68.4.2.** A tolerance up to minus 15 percent in thickness and 20 mm. length will be allowed For fittings tolerance in lengths shall be plus 25 mm. and minus 10 mm.

**68.4.3.** The thickness of fittings and their socket and spigot dimensions shall conform to the thickness and dimensions specified for the corresponding sizes of straight pipes. The tolerance in weights and thickness shall be the same as for straight pipes.

**M-69. Nahni Trap**

**69.1.** Nahni trap shall be of cast iron and shall be sound and free from porosity or other defects which affect serviceability The thickness of the base metal shall not be less than 6.5 mm The surface shall be smooth and free .form craze, chips and other flaws or any other kind of defects which affect serviceability The size of nahni trap shall be specified and shall be of self cleaning design.

**69.2.** The Nahni trap shall be of-quality approved by the Engineer-in-charge and shall generally conform to the relevant Indian Standards.

**69.3.** The Nahni trap provide shall be with deep seal, minimum 50 mm. except at places where trap with deep seal cannot be accommodated. The cover shall be cast iron perforated cover shall be provided on the trap of appropriate size.

**M-70. Gully Trap**

- 70.1. Gully trap shall conform to I.S. 651-1980. It shall be some, free from defects such as fire-cracks or hair cracks. The glaze of the traps shall be free from crazing. They shall give a sharp clear note when struck with light hammer. There shall be no broken blisters.
- 70.2. The size of the gully trap shall be as specified in the item.
- 70.3. Each gully trap shall have one C.I. grating of square size corresponding to the dimensions, of inlet of gully trap. It will also have a water tight C.I. cover with frame inside dimensions 300 mm. x 300 mm. the cover with frame inside dimensions 300 mm. x 300 mm. the cover and weighing not less than 4.53 Kg. and the frame not less than 2.72 Kg. The grating cover and frame shall be of sound and good casting and shall have truly square machined seating faces.

**M 71. Glazed Stone Ware pipe And Fittings**

- 71.1. The pipes and fittings shall be of best quality as approved, by the Engineer-in-charge. The pipe shall be of best quality manufactured from stone- ware of fire clay, salt glazed thoroughly burnt through the whole thickness, of a close, even texture, free from air blows, fire blisters, cracks and other imperfections, which affect the serviceability. The inner and outer surfaces shall be smooth and perfectly glazed. The pipe shall be capable to withstand pressures or 1.5 M lead without showing sign of leakage. The thickness of the wall shall not be less than 1/12th of the internal dia. The depth of socket shall not be less than 38 mm. The socket shall be sufficiently large to allow a joint of 6 mm. around the pipe.
- 71.2. The pipes shall generally conform to relevant I S 651-1980.

**M-72. Wall Peg Rail**

- 72.1. The aluminum wall peg rail shall have three aluminum pegs approved quality and size. It shall be fixed on teakwood plank of size 450 mm x 75 mm x 20 mm. The teakwood shall be French polished or oil painted as specified.

**M-73. G.I. Water Spot**

- 73.1. The G.I. pipes of 40 mm dia shall be of medium quality and specials shall be of 'R' brand or equivalent brand of best approved quality
- 73.2. The pipe shall have length as required for the thickness of wall in which it is fixed and at outside end tee bend cut at half the length shall be provided and at other end coupling shall be provided to have better fixing. The water spout shall be provided as per detailed drawing or as directed.

**M-74. Asbestos Cement pipe (A.C. pipe)**

- 74.1. The asbestos cement pipe of diameter as specified in the description of the item shall conform to I.S. 1626-1980. Special like bends, shoes, cowls, etc. shall conform to relevant Indian Standards. The interior of pipe shall have is smooth finish, regular surface and regular internal diameter. The tolerance in all dimensions shall be as I.S. 1626-part-I-1980.

**M-75. Crydon Ball valve**

- 75.1. Ball valve of screwed type including polythene float and necessary level etc shall be of the size as mentioned in the description of item and shall conform to I.S 1703-1977

**M-76. Bitumen Felt For Water proofing And Damp Proofing**

- 76.1. Bitumen felt shall be on the fiber bases and shall be of type 2, self finished felt grade-2 and shall conform to I.S. 1322-1970

**M-77. Selected Earth**

- 77.1.** The selected earth shall be that obtained from excavated material or shall have to be brought from outside as indicated in the items. If item does not indicate anything the selected earth shall have to be brought from outside.
- 77.2.** The selected earth shall be good yellow soil and shall be got approved from the Engineer-in-charge. In no case black cotton soil or similar expansive and shrinkable soil shall be used. It shall be clean and free from all rubbish and perishable materials, stones or brick bats. The clods shall be broken to a size of 50 mm or less. Contractor shall make his own arrangement at his own cost for land for borrowing selected earth. The stacking of material shall be done as directed by the Engineer-in-charge in such a way not to interfere with any construction activities and in proper stacks.
- 77.3.** When excavated material is to be used only selected stuff got approved from the Engineer-in-charge shall be used. It shall be stacked separately and shall, comply with all the requirements of selected earth mentioned above.

**M-78. Barbed Wire**

- 78.1.** The barbed wire shall be of galvanized steel and it shall generally conform to I.S. 278-1978. The barbed wire shall be of types-I whose nominal diameter for line wire shall be 2.5 mm. and point wire 2.24 mm. The nominal distance between two barbs shall be 75 mm unless otherwise specified in the item. The barbed wire shall be formed by twisting together two fine wires. One containing the barbs. The size of the line and point wires and barb spacing shall be as specified above. The permissible deviation from the nominal diameter of the line wire and point wire shall not exceed  $\pm 0.08$  mm
- 78.2.** The barbs shall carry four points and shall be formed by twisting two point wires, each two turns tightly round one line wire making altogether four complete turns. The barbs shall have a length of not less than 13 mm and not more than 18 mm. The point shall be sharp and cut at an angle not greater than 35 degree of the axis of the wire forming the barbs.
- 78.3.** The line and point wires shall be circular in section, free from scale and other defects and shall be uniformly galvanized. The line wire shall be in continuous length and shall not contain any welds other than those in the rod before it is drawn. The distance between two successive splices shall not be less than 15 meters.
- 78.4.** The lengths per 100 Kg. of barbed wire I.S. type I shall be as under:
- |                    |                   |                     |
|--------------------|-------------------|---------------------|
| Nominal 1000 meter | Minimum 934 meter | Maximum 1066 Meter. |
|--------------------|-------------------|---------------------|

Item No. 1 Excavation for foundation upto 1.5 m. depth incl. sorting out stacking of useful materials and disposing off the excavated stuff upto 50mt lead.(A) Loose or soft soil

**4.0.0 (a)** Excavation for foundation upto 1.5 M depth including sorting out and stacking useful materials disposing of the excavated stuff upto 50 metre lead-in loose or soft soil.

**1.0. General: 1.1.** Any soil which generally yields to the application of pickaxes and shovels, phawaras, rakes or any such ordinary excavating implement or organic soil, gravel, silt, sand turf, loam, clay, peat etc., fall under this category.

**2.0 Clearing the site : 2.1** The site on which the structure is to be built shall be cleared and all obstructions, loose stone, materials and rubbish of all kind, bush, wood and trees shall be removed as directed: The materials so obtained shall be property of the Government and be conveyed and stacked as directed within 50 M. lead. The roots of the trees coming in the sides shall be cut and coated with a hot asphalt.

**2.2** The rate of site clearance is deemed to be included in the rate of earth work for which no extra will be paid.

**3.0 Setting out:** After clearing the site, the center lines will be given by the Engineer-in-charge. The contractor shall assume full responsibility for alignment, elevation and dimension of each and all parts of the tractor shall assume full responsibility for alignment elevation and dimension of each and all parts of the work. Contractor shall supply labourers, materials, etc. required for setting out the reference marks and bench marks and shall maintain them as long as required and directed.

**4.0 Excavation :** The excavation in foundation shall be carried out in true line and level and shall have the width and depth as shown in the drawings or as directed. The contractor shall do the necessary shoring and shutting or providing necessary slopes to a safe angle, at his own cost. The payment for such precautionary measures shall be paid separately if not specified. The bottom of the excavated area shall be levelled both longitudinally and transversely as directed by removing and watering as required. No earth filling will be allowed for bringing it to level, if by mistake or any other reason excavation is made 22 deeper or wider than shown on the plan or directed. The extra depth or width shall be made up with concrete of same proportion as specified for the foundation concrete at the cost of the contractor. The excavation upto 1.5 m. depth shall be measured under this item.

**5.0. Disposal of the excavated stuff : 5.1.** The excavated stuff of the selected type shall be used in filling the trenches and plinth or levelling the ground in layers including ramming and watering etc. **5.2.** The balance of the excavated quantity shall be removed by the contractor from the site of work to a place as directed with lead upto 50 M. and all lift.

**6.0. Mode of measurement and payment:**

**6.1.** The measurement of excavation in trenches for foundation shall be made according to the sections of trenches shown on the drawing or as per sections given by the Engineer-in-charge. No payment shall be made for surplus excavation made in excess of above requirements or due to slopping and sloping back as found necessary on account of conditions of soil and requirements of safety.

**6.2.** The rate shall be for a unit of one cubic metre.

Item No. 2 Filling in plinth with sand under floors incl. watering ramming consolidating and dressing etc. comp.



**4.24.** Filling in plinth with sand under floors including watering, ramming consolidating and dressing etc. complete. 1.0. Materials: 1.1. Sand shall conform to M. 6.

**2.0. Workmanship :** 2.1. The relevant specifications of item No. 4.12 shall be followed except that sand shall be filled inundo, floors, including watering, ramming, consolidating and dressing etc. complete.

**3.0. Mode of measurement and payment:**

3.1. The relevant specifications of item No. 4.12 shall be followed.

3.2. The rate includes cost of collecting carting sand with all lead and labour for filling the same in plinth under floors.

3.3. The rate shall be for a unit of one cubic metre

Item No. 3 Providing and laying Cement concrete 1:4:8 (1 cement:4 coarse sand:8 Graded Stone Agg. 40 mm nominal Size ) & Quaring etc. complete. Excluding cost of form work in (A)Foundation & Plinth

**1.0. Materials :** Water shall conform to M-I. Cement shall conform to M-3. Sand shall conform to M-6. Grit shall conform to M-8. Graded stone aggregate 20 mm. nominal size shall conform to M-12.

**2.0. General:**

2.1. The concrete mix is not required to be designed by preliminary tests. The proportion of the concrete mix shall be 1 : 2 :

4 (1 cement: 4 coarse sand ; 8 graded stone aggregate 40 mm. nominal size) by volume.

Concrete work shall have exposed concrete surface or as specified in the item.

2.2. The designation ordinary M-100, M-150, M-200, M-250 specified as per. I.S.

Corresponding approximately to 1 : 3 : 6,

1 : 2 : 4, 1 : 1 1/2 : 3 and 1:1:2 nominal mix of ordinary concrete by volume respectively.

2.3. The ingredients required for ordinary concrete containing one beg of cement of 50 Kg. by weight (0.0342 Cu. M.) for

different proportions of mix shall be as under:

Grade of  
concrete

Total quantity of dry aggregate by volume  
per 50 Kgs. of cement to be taken as the

sum of individual volume of fine and

coarse aggregates, maximum

Proportion of fine aggregate to

coarse aggregate

Quantity of

water per 50 Kgs.

of cement

maximum.

1 2 3 4

M-100 ( 1 : 3: 6) 300 Liters Generally 1 : 2 for fine aggregate 34 Liters

M-150 ( 1 : 2 : 4) 2.20 " to coarse aggregate by volume 32 "

M-200 ( 1 : 1 1/2 : 3) 160 " but subject to and upper limit 30 "

M-250 ( 1:1:2) 100 " of 1 : 1 1/2 and lower limit 1 : 3 27 "

2.4. The water cement ratios shall not more than those specified in the above table. The cement content of the mix specified

in the Table shall be increased if the quantity of water in a mix has to be increased to overcome the difficulties of placement and compaction so that the water-cement-ratio specified in the Table is not exceeded.

2.5. Workability of the concrete shall be controlled by maintaining a water-cement-ratio that is bound to give a concrete mix which is just sufficiently wet to be placed and compacted without difficulty with the means available.

2.6. The maximum size of coarse aggregate shall be as large as possible within the limits specified but in no case greater than one fourth of the minimum thickness of the member, provided that the concrete can be placed without difficulty so as to surround all reinforcement thoroughly and to fill the corners of the form.

2.7. For reinforced concrete work, coarse aggregates having a nominal size of 20 mm. are generally considered satisfactory.

2.8. For heavily reinforced concrete members as in the case of ribs of main beams, the nominal maximum size of coarse aggregate should usually be restricted to 5 mm. less than the minimum, clear distance between the main bars, or 5 mm. less than the minimum cover to the reinforcement whichever is smaller.

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2.9. Where the reinforcement is widely spaced as in solid slabs, limitations of size of the aggregate may not be important and the nominal maximum size may sometimes be as great as or greater than the minimum cover.

2.10. Admixture may be used in concrete only with approval of Engineer-in-charge based upon the evidence that with the passage of time, neither the compressive strength of concrete is reduced nor are other requisite qualities of concrete and steel impaired by the use of such admixtures.

### **3.0. Workmanship:**

3.1. Proportioning : Proportioning shall be done by volume, except cement which shall be measured in terms of bags of 50 Kg. weight. The volume of one such bag being taken as 0.0342 Cu. metre. Boxes of suitable sizes shall be used for measuring sand aggregate. The size of the boxes (internal) shall be 35 cms. x 25 cms. and 40 Cms. deep. While measuring the aggregate and sand, the box shall be filled without shaking ramming or hammering. The proportioning of sand shall be on the basis of its dry volume and in case of damp sand, allowances for bulkage shall be made.

### **3.2 Mixing:**

3.2.1. For all work, concrete shall "be mixed in a mechanical mixer which alongwith other accessories shall be kept in first class working condition and so maintained throughout the construction. Measured quantity of aggregate, sand, cement required for each batch shall be poured into the drum of the mechanical mixer while it is continuously running. After about half a minute of dry mixing, measured quantity of water required for each batch of concrete mix shall be added gradually and mixing continued for another one and a half minute. Mixing shall be continued till materials are uniformly distributed and

uniform colour of the entire mass is obtained and each individual particle of the coarse aggregate shows complete coating of mortar containing its proportionate amount of cement. In no case shall the mixing be done for less than 2 minutes after all ingredients have been put into the mixer.

3.2.2. When hand mixing is permitted by the Engineer-in-charge for small jobs or for certain other reasons, it shall be done on the smooth watertight platform large enough to allow efficient turning over the ingredients of concrete before and after adding water. Mixing platform shall be so arranged that no foreign material gets mixed with concrete nor does the mixing water flow out. Cement in required number of bags shall be placed in a uniform layer on top of the measured quantity of fine and coarse aggregate, which shall also be spread in a layer of uniform thickness on the mixing platform. Dry coarse and fine aggregate and cement shall then be mixed thoroughly by turning over to get a mixture to uniform colour. Specified quantity of water shall then be added gradually through a rose-can and the mass turned over till a mix of required consistency is obtained. In hand mixing, quantity of cement shall be increased by 10 percent above that specified.

3.2.3. Mixers which have been out of use for more than 30 minutes shall be thoroughly cleaned before putting in a new batch. Unless otherwise agreed to by the Engineer-in-charge the first batch of concrete from the mixture shall contain only two thirds of normal quantity of coarse aggregate. Mixing plant shall be thoroughly cleaned before changing from one type of cement to another. .

3.3. Consistency: 3.3.1. The degree of consistency which shall depend upon the nature of the work and methods of vibration of concrete, shall be determined by regular slump tests in accordance with I.S. 1199-1959. The slump of 10 mm. to 25 mm. shall be adopted when vibrators are used and 80 mm. when vibrators are not used.

#### **4.4. Inspection:**

3.4.1. Contractor shall give the Engineer-in-charge due notice before placing any concrete in the forms to permit him to inspect and accept the false work and forms as to their strength, alignment, and general fitness but such inspection shall not relieve the contractor of his responsibility for the safety of men, machinery, materials and for results obtained. Immediately before concreting, all forms shall be thoroughly cleaned.

3.4.2. Centering design and its erection shall be got approved from the Engineer-in-charge. One carpenter with helper shall invariably be kept present throughout the period of concreting. Movement of labour and other persons shall be totally prohibited for reinforcement laid in position. For access to different parts, suitable mobile platforms shall be provided so that steel reinforcement in position is not disturbed. For ensuring proper cover, mortar blocks of suitable size shim be cast and tied to the reinforcement. Timber, kapachi or metal pieces shall not be used for this purpose.

### **3.5. Transporting and laying:**

3.5.1. The method of transporting and placing concrete shall be as approved. Concrete shall be so transported and placed that no contamination segregation or loss of its constituent material takes place. All form work shall be cleaned and made free from standing water, dust, snow or ice immediately before placing of concrete.

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No concrete shall be placed in any part of the structure until the approval of the Engineer-in-charge has been obtained.

3.5.2. Concreting shall proceed continuously over the area between construction joints.

Fresh concrete shall not be placed

against concrete which has been in position for more than 30 minutes unless a proper construction joint is formed. Concrete

shall be compacted in its final position within 30 minutes of its discharge from the mixer.

Except where otherwise agreed to

by the Engineer-in-charge concrete shall be deposited in horizontal layers to a compacted depth of not more than 0.45 metre

when internal vibrators are used and not exceeding 0.30 metre in all other cases.

3.5.3. Unless otherwise agreed to by the Engineer-in-charge, concrete shall not be dropped into place from a height exceeding

2 metres. When trucking or chutes are used they shall be kept close and used in such a way as to avoid segregation. When

concreting has to be resumed on a surface which has hardened, it shall be roughened, swept clean, thoroughly wetted and

covered with a 13 mm. thick layer of mortar composed of cement and sand in the same ratio as in the concrete mix itself. This

13 mm. layer of mortar shall be freshly mixed and placed immediately before placing of new concrete. Where concrete has

not fully hardened, all laitance shall be removed by scrubbing the wet surface with wire or bristle brushes, care being taken

to avoid dislodgement of any particles of coarse aggregate. The surface shall then be thoroughly wetted, all free water

removed and then coated with neat cement grout. The first layer of concrete to be placed on this surface shall not exceed 150

mm. in thickness and shall be well rammed against old work, particular attention being given to corners and close spots.

3.5.4. All concrete shall be compacted to produce a dense homogeneous mass with the assistance of vibrators unless,

otherwise permitted by the Engineer-in-charge for exceptional cases, such as concreting under water, where vibrators cannot

be used. Sufficient vibrators in serviceable condition shall be kept at site so that spare equipment is always available in the event of breakdowns.

Concrete shall be judged to be compacted when the mortar fills the spaces between the coarse aggregate and begins to cream

up to form an even surface. Compaction shall be completed before the initial setting starts i.e. within 30 minutes of addition

of water to dry mixture. During compaction, it shall be observed that needle vibrators are not applied on reinforcement which

is likely to destroy the bond between concrete and reinforcement.

**3.6. Curing:** Immediately after compaction, concrete shall be protected from weather, including rain, running water, shocks, vibration, traffic, rapid temperature changes, frost and drying out process. It shall be covered with wet sacking, hassain or other similar absorbant material approved, soon after the initial set and shall be kept continuously wet for a period of not less than 14 days from the date of placement. Masonary work over foundation concrete may be started after 48 hours of its laying but curing of concrete shall be continued for a minimum period of 14 days.

**3.7. Sampling and Testing of concrete :**

3.7.1. Samples from fresh concrete shall be taken as per I.S. 1199-1959 and cubes shall be made, cured and tested at 7 days or 28 days as per requirements in accordance with I.S. 516-1959. A random sampling procedure shall be adopted to ensure that each concrete batch shall have a resonable chance of being tested i.e. the sampling should be spread over the entire period of concreting and cover all mixing units. The minimum frequency of sampling of concrete of each grade shall be in accordance with following :

Quantity of concrete in the work	No. of samples	Quantity of concrete in the works	No. of samples
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1-5Cmt.	1	16-30Cmt.	3
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6-15Cmt.	2	31-50	4
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51 and above 4 + one additional for each additional 50 M. or part thereof.

NOTE : At least one sample shall be taken from each shift. Ten test specimens shall be made from each sample, five for testing at 7 days and the remaining five at 28 days. The samples of concrete shall be taken on each day of the concreting as per above frequency. The number of specimens may be suitably increased as deemed necessary by the Engineer-in-charge when procedure of tests given above reveals a poor quality of concrete and in other special cases.

3.7.2. Tire average strength of the group of cubes cast for each day shall not be less than the specified cube strength of 150

Kg/Cm at 28 days. 20% of the cubes cast for each day may have value less than the specified strength provided the lowest value is not less than 85% of the specified strength. If the concrete made in accordance with the proportions given for a particular grade docs not yield the specified strength, such concrete shall be classified as belonging to the appropriate lower, grade concrete made in accordance with the proportions given for a particular grade shall not, however, be placed in a higher grade on the ground that the test strength are higher than the minimum specified.

**3.8. Stripping:**

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3.8.1. The Engineer-in charge shall be informed in advance by the contractor of his intention lo strike the form work. While fixing the time for removal of form work, due consideration shall be given to local conditions, character of the structure, the

weather and other condition that influence the setting of concrete and of the materials used in the mix. In normal circumstances (generally where temperatures are above 20 ° C) and where ordinary concrete is used, forms may be struck after expiry of periods specified in item No. 9.1 (A) for respective item of form work.

3.8.2. All form work shall be removed without causing any shock or vibration as would damage the concrete. Before the soffit and struts are removed, the concrete surface shall be exposed, where necessary in order to ascertain that the concrete has sufficiently hardened. Centring shall be gradually and uniformly lowered in such manner as to permit the concrete to take stresses due to its own weight uniformly and gradually. Where internal metal ties are permitted, they or their removable parts shall be extracted without causing any damage to the concrete and remaining holes filled with mortar. No permanently embedded metal part shall have less than 25 mm. cover to the finished concrete surface. Where it is intended to re-use the form work, it shall be cleaned and made good to the satisfaction of the Engineer-in-charge. After removal of form work and shuttering, the Executive Engineer shall inspect the work and satisfy by random checks that concrete produced is of good quality.

3.8.3. Immediately after the removal of forms, all exposed bolts etc., passing through the cement concrete member and used for shuttering or any other purpose shall be cut inside the cement concrete member to a depth of at least 25 mm. below the surface of the concrete and the resulting holes be filled by cement mortar. All fine caused by form joints, all cavities produced by the removal of form ties and all other holes and depressions honeycomb spots, broken edges or corners and other defects shall be thoroughly cleaned, saturated with water and carefully pointed and rendered true with mortar of cement and fine aggregate mixed in the proportions used in the grade of concrete that is-being finished and of as dry consistency as is possible to use. Considerable pressure shall be applied in filling and pointing to ensure thorough filling in all voids. Surfaces which are pointed shall be kept moist for a period of 24 hours. If rock pockets/honeycombs in the opinion of the Engineer in-charge are of such an extent or character to effect the strength of the structure materially or to endanger the life of the steel reinforcement, he may declare the concrete defective and require the removal and replacement of the portions of the structure affected.

#### **4.0. Mode of measurement and payment:**

4.1. The consolidated cubical contents of concrete work as specified in item shall be measured. The concrete laid in excess of section shown on drawings or as directed shall not be measured. No deduction shall be made for

(a) Ends of dissimilar materials such as joists, beams, posts, girders, rafters, purline trusses, corbels and steps etc upto 500 Sq. Cm. in section.

(b) Opening upto 0.1 Sq. M.

4.2. The rate includes cost of all materials, labour, tools and plant required for mixing, placing, position, vibrating and compacting, finishing, as directed, curing and all other incidental expenses for producing concrete lied strength The rate excludes the cost of form work.

4.3. The rate shall be for a unit of one cubic metre.

Item No. 4 Provdg & laying cement concrate 1:2:4 (1Cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) and curing complete excluding cost of form work in (A) Foundation & plinth

**1.0. Materials :** Water shall conform to M-I. Cement shall conform to M-3. Sand shall conform to M-6. Grit shall conform to M-8. Graded stone aggregate 20 mm. nominal size shall conform to M-12.

**2.0. General:**

2.1. The concrete mix is not required to be designed by preliminary tests. The proportion of the concrete mix shall be 1 : 2 :

4 (1 cement: 2 coarse sand ; 4 graded stone aggregate 10 mm. nominal size) by volume.

Concrete work shall have exposed concrete surface or as specified in the item.

2.2. The designation ordinary M-100, M-150, M-200, M-250 specified as per. I.S. Corresponding approximately to 1 : 3 : 6,

1 : 2 : 4, 1 : 1 1/2 : 3 and 1:1:2 nominal mix of ordinary concrete by volume respectively.

2.3. The ingredients required for ordinary concrete containing one beg of cement of 50 Kg. by weight (0.0342 Cu. M.) for

different proportions of mix shall be as under:

Grade of  
concrete

Total quantity of dry aggregate by volume  
per 50 Kgs. of cement to be taken as the  
sum of individual volume of fine and

coarse aggregates, maximum

Proportion of fine aggregate to  
coarse aggregate

Quantity of  
water per 50 Kgs.

of cement  
maximum.

1 2 3 4

M-100 (1 : 3: 6) 300 Liters Generally 1 : 2 for fine aggregate 34 Liters

M-150 (1 : 2 : 4) 2.20 " to coarse aggregate by volume 32 "

M-200 (1 : 1 1/2 : 3) 160 " but subject to and upper limit 30 "

M-250 ( 1:1:2) 100 " of 1 : 1 1/2 and lower limit 1 : 3 27 "

2.4. The water cewment ratios shall not more than those specified in the above table. The cement content of the mix specified

in the Table shall be increased if the quantity of water in a mix has to be increased to overcome the difficulties of placement and compaction so that the water-cement-ratio specified in the Table is not exceeded.

2.5. Workability of the concrete shall be controlled by maintaining a water-cement-ratio that is bound to give a concrete mix which is just sufficiently wet to be placed and compacted without difficulty with the means available.

2.6. The maximum size of coarse aggregate shall be as large as possible within the limits specified but in no case greater than one fourth of the minimum thickness of the member, provided that the concrete can be placed without difficulty so as to surround all reinforcement thoroughly and to fill the corners of the form.

2.7. For reinforced concrete work, coarse aggregates having a nominal size of 20 mm. are generally considered satisfactory.

2.8. For heavily reinforced concrete members as in the case of ribs of main beams, the nominal maximum size of coarse aggregate should usually be restricted to 5 mm. less than the minimum, clear distance between the main bars, or 5 mm. less than the minimum cover to the reinforcement whichever is smaller.

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2.9. Where the reinforcement is widely spaced as in solid slabs, limitations of size of the aggregate may not be important and the nominal maximum size may sometimes be as great as or greater than the minimum cover.

2.10. Admixture may be used in concrete only with approval of Engineer-in-charge based upon the evidence that with the passage of time, neither the compressive strength of concrete is reduced nor are other requisite qualities of concrete and steel impaired by the use of such admixtures.

### **3.0. Workmanship:**

3.1. Proportioning : Proportioning shall be done by volume, except cement which shall be measured in terms of bags of 50 Kg. weight. The volume of one such bag being taken as 0.0342 Cu. metre. Boxes of suitable sizes shall be used for measuring sand aggregate. The size of the boxes (internal) shall be 35 cms. x 25 cms. and 40 Cms. deep. While measuring the aggregate and sand, the box shall be filled without shaking ramming or hammering. The proportioning of sand shall be on the basis of its dry volume and in case of damp sand, allowances for bulkage shall be made.

### **3.2 Mixing:**

3.2.1. For all work, concrete shall "be mixed in a mechanical mixer which alongwith other accessories shall be kept in first class working condition and so maintained throughout the construction. Measured quantity of aggregate, sand, cement required for each batch shall be poured into the drum of the mechanical mixer while it is continuously running. After about half a minute of dry mixing, measured quantity of water required for each batch of concrete mix shall be added gradually and mixing continued for another one and a half minute. Mixing shall be continued till materials are uniformly distributed and



uniform colour of the entire mass is obtained and each individual particle of the coarse aggregate shows complete coating of mortar containing its proportionate amount of cement. In no case shall the mixing be done for less than 2 minutes after all ingredients have been put into the mixer.

3.2.2. When hand mixing is permitted by the Engineer-in-charge for small jobs or for certain other reasons, it shall be done on the smooth watertight platform large enough to allow efficient turning over the ingredients of concrete before and after adding water. Mixing platform shall be so arranged that no foreign material gets mixed with concrete nor does the mixing water flow out. Cement in required number of bags shall be placed in a uniform layer on top of the measured quantity of fine and coarse aggregate, which shall also be spread in a layer of uniform thickness on the mixing platform. Dry coarse and fine aggregate and cement shall then be mixed thoroughly by turning over to get a mixture to uniform colour. Specified quantity of water shall then be added gradually through a rose-can and the mass turned over till a mix of required consistency is obtained. In hand mixing, quantity of cement shall be increased by 10 percent above that specified.

3.2.3. Mixers which have been out of use for more than 30 minutes shall be thoroughly cleaned before putting in a new batch. Unless otherwise agreed to by the Engineer-in-charge the first batch of concrete from the mixture shall contain only two thirds of normal quantity of coarse aggregate. Mixing plant shall be thoroughly cleaned before changing from one type of cement to another. .

3.3. Consistency: 3.3.1. The degree of consistency which shall depend upon the nature of the work and methods of vibration of concrete, shall be determined by regular slump tests in accordance with I.S. 1199-1959. The slump of 10 mm. to 25 mm. shall be adopted when vibrators are used and 80 mm. when vibrators are not used.

#### **4.4. Inspection:**

3.4.1. Contractor shall give the Engineer-in-charge due notice before placing any concrete in the forms to permit him to inspect and accept the false work and forms as to their strength, alignment, and general fitness but such inspection shall not relieve the contractor of his responsibility for the safety of men, machinery, materials and for results obtained. Immediately before concreting, all forms shall be thoroughly cleaned.

3.4.2. Centering design and its erection shall be got approved from the Engineer-in-charge. One carpenter with helper shall invariably be kept present throughout the period of concreting. Movement of labour and other persons shall be totally prohibited for reinforcement laid in position. For access to different parts, suitable mobile platforms shall be provided so that steel reinforcement in position is not disturbed. For ensuring proper cover, mortar blocks of suitable size shim be cast and tied to the reinforcement. Timber, kapachi or metal pieces shall not be used for this purpose.

### **3.5. Transporting and laying:**

3.5.1. The method of transporting and placing concrete shall be as approved. Concrete shall be so transported and placed that no contamination segregation or loss of its constituent material takes place. All form work shall be cleaned and made free from standing water, dust, snow or ice immediately before placing of concrete.

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No concrete shall be placed in any part of the structure until the approval of the Engineer-in-charge has been obtained.

3.5.2. Concreting shall proceed continuously over the area between construction joints.

Fresh concrete shall not be placed

against concrete which has been in position for more than 30 minutes unless a proper construction joint is formed. Concrete

shall be compacted in its final position within 30 minutes of its discharge from the mixer.

Except where otherwise agreed to

by the Engineer-in-charge concrete shall be deposited in horizontal layers to a compacted depth of not more than 0.45 metre

when internal vibrators are used and not exceeding 0.30 metre in all other cases.

3.5.3. Unless otherwise agreed to by the Engineer-in-charge, concrete shall not be dropped into place from a height exceeding

2 metres. When trucking or chutes are used they shall be kept close and used in such a way as to avoid segregation. When

concreting has to be resumed on a surface which has hardened, it shall be roughened, swept clean, thoroughly wetted and

covered with a 13 mm. thick layer of mortar composed of cement and sand in the same ratio as in the concrete mix itself. This

13 mm. layer of mortar shall be freshly mixed and placed immediately before placing of new concrete. Where concrete has

not fully hardened, all laitance shall be removed by scrubbing the wet surface with wire or bristle brushes, care being taken

to avoid dislodgement of any particles of coarse aggregate. The surface shall then be thoroughly wetted, all free water

removed and then coated with neat cement grout. The first layer of concrete to be placed on this surface shall not exceed 150

mm. in thickness and shall be well rammed against old work, particular attention being given to corners and close spots.

3.5.4. All concrete shall be compacted to produce a dense homogeneous mass with the assistance of vibrators unless,

otherwise permitted by the Engineer-in-charge for exceptional cases, such as concreting under water, where vibrators cannot

be used. Sufficient vibrators in serviceable condition shall be kept at site so that spare equipment is always available in the event of breakdowns.

Concrete shall be judged to be compacted when the mortar fills the spaces between the coarse aggregate and begins to cream

up to form an even surface. Compaction shall be completed before the initial setting starts i.e. within 30 minutes of addition

of water to dry mixture. During compaction, it shall be observed that needle vibrators are not applied on reinforcement which

is likely to destroy the bond between concrete and reinforcement.

**3.6. Curing:** Immediately after compaction, concrete shall be protected from weather, including rain, running water, shocks, vibration, traffic, rapid temperature changes, frost and drying out process. It shall be covered with wet sacking, hassain or other similar absorbant material approved, soon after the initial set and shall be kept continuously wet for a period of not less than 14 days from the date of placement. Masonary work over foundation concrete may be started after 48 hours of its laying but curing of concrete shall be continued for a minimum period of 14 days.

**3.7. Sampling and Testing of concrete :**

3.7.1. Samples from fresh concrete shall be taken as per I.S. 1199-1959 and cubes shall be made, cured and tested at 7 days or 28 days as per requirements in accordance with I.S. 516-1959. A random sampling procedure shall be adopted to ensure that each concrete batch shall have a resonable chance of being tested i.e. the sampling should be spread over the entire period of concreting and cover all mixing units. The minimum frequency of sampling of concrete of each grade shall be in accordance with following :

Quantity of concrete in the work	No. of samples	Quantity of concrete in the works	No. of samples
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1-5Cmt.	1	16-30Cmt.	3
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6-15Cmt.	2	31-50	4
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51 and above 4 + one additional for each additional 50 M. or part thereof.

NOTE : At least one sample shall be taken from each shift. Ten test specimens shall be made from each sample, five for testing at 7 days and the remaining five at 28 days. The samples of concrete shall be taken on each day of the concreting as per above frequency. The number of specimens may be suitably increased as deemed necessary by the Engineer-in-charge when procedure of tests given above reveals a poor quality of concrete and in other special cases.

3.7.2. Tire average strength of the group of cubes cast for each day shall not be less than the specified cube strength of 150

Kg/Cm at 28 days. 20% of the cubes cast for each day may have value less than the specified strength provided the lowest value is not less than 85% of the specified strength. If the concrete made in accordance with the proportions given for a particular grade docs not yield the specified strength, such concrete shall be classified as belonging to the appropriate lower, grade concrete made in accordance with the proportions given for a particular grade shall not, however, be placed in a higher grade on the ground that the test strength are higher than the minimum specified.

**3.8. Stripping:**

35

3.8.1. The Engineer-in charge shall be informed in advance by the contractor of his intention lo strike the form work. While fixing the time for removal of form work, due consideration shall be given to local conditions, character of the structure, the

weather and other condition that influence the setting of concrete and of the materials used in the mix. In normal

circumstances (generally where temperatures are above 20 ° C) and where ordinary concrete is used, forms may be struck

after expiry of periods specified in item No. 9.1 (A) for respective item of form work.

3.8.2. All form work shall be removed without causing any shock or vibration as would damage the concrete. Before the soffit

and struts are removed, the concrete surface shall be exposed, where necessary in order to ascertain that the concrete has

sufficiently hardened. Centring shall be gradually and uniformly lowered in such manner as to permit the concrete to take

stresses due to its own weight uniformly and gradually. Where internal metal ties are permitted, they or their removable parts

shall be extracted without causing any damage to the concrete and remaining holes filled with mortar. No permanently

embedded metal part shall have less than 25 mm. cover to the finished concrete surface.

Where it is intended to re-use the form

work, it shall be cleaned and made good to the satisfaction of the Engineer-in-charge. After removal of form work and

shuttering, the Executive Engineer shall inspect the work and satisfy by random checks that concrete produced is of good quality.

3.8.3. Immediately after the removal of forms, all exposed bolts etc., passing through the cement concrete member and used

for shuttering or any other purpose shall be cut inside the cement concrete member to a depth of at least 25 mm. below the

surface of the concrete and the resulting holes be filled by cement mortar. All fine caused by form joints, all cavities produced

by the removal of form ties and all other holes and depressions honeycomb spots, broken edges or corners and other defects

shall be thoroughly cleaned, saturated with water and carefully pointed and rendered true with mortar of cement and fine

aggregate mixed in the proportions used in the grade of concrete that is-being finished and of as dry consistency as is possible

to use. Considerable pressure shall be applied in filling and pointing to ensure thorough filling in all voids. Surfaces which

are pointed shall be kept moist for a period of 24 hours.

If rock pockets/honeycombs in the opinion of the Engineer in-charge are of such an extent or character to effect the strength

of the structure materially or to endanger the life of the steel reinforcement, he may declare the concrete defective and

require the removal and replacement of the portions of the structure affected.

#### **4.0. Mode of measurement and payment:**

4.1. The consolidated cubical contents of concrete work as specified in item shall be measured. The concrete laid in excess

of section shown on drawings or as directed shall not be measured. No deduction shall be made for

(a) Ends of dissimilar materials such as joists, beams, posts, girders, rafters, purline trusses, corbels and steps etc upto 500 Sq.

Cm. in section.

(b) Opening upto 0.1 Sq. M.

4.2. The rate includes cost of all materials, labour, tools and plant required for mixing, placing, position, vibrating and compacting, finishing, as directed, curing and all other incidental expenses for producing concrete lied strength The rate excludes the cost of form work.

4.3. The rate shall be for a unit of one cubic metre.

Item No- 5 Brick work using common burnt clay building bricks having crushing strength not less than 35 kg/ sq. C.M. In foundation and plinth in cement mortar 1:6 ( 1 cement : 6 fine sand)

**1.0. Materials**

Bricks shall conform to M-15. Cement mortar shall conform to M-11.

**2.0. Workmanship**

**2.1. Proportion:**

2.1.1. The proportion of the cement mortar shall be 1:6 (1 cement: 6 fine sand) by volume.

**2.2. Wetting of bricks:**

2.2.1. The bricks required for masonry shall be thoroughly wetted with clean water for about two hours before use or as directed. The cessation of bubbles, when the bricks are wetted with water is as indication of through wetting of bricks.

**2.3. Laying:**

2.3.1. Bricks shall be laid in English bond unless directed otherwise. Half or cut bricks shall not be used except when necessary to complete to bond; closures in such case shall be cut to required size and used near the ends of walls.

2.3.2. A layer of mortar shall be spread on full width for suitable length of the lower course. Each brick shall first be property bedded and set home by gently tapping with handle of trowel or wooden mallet. Its inside face shall be flushed with mortar before the next brick is laid and pressed against it. On completion of course, the vertical joints shall be fully filled from the top with mortar.

2.3.3. The walls shall be taken up truly in plumb. All courses shall be laid truly horizontal and all vertical joint shall be truly vertical. Vertical joints in alternate course shall generally be directly one over the other. The thickness of brick course shall be kept uniform.

2.3.4. The brick shall be laid with frog up wards. A set of tools comprising of wooden straight edges, mason's spirit level, square half meter rub, and pins, string and plumb shall be kept on the site of work for frequent checking during the progress of work.

**2.3.5.** Both the faces of walls of thickness greater than 23 cms. shall be kept in proper place. All the connected brick work shall be kept not more than one meter over the rest of the work. Where this is not possible, the work shall be raked back according to bond (and not left toothed) at an angle not steeper than 45 degrees.

**2.3.6.** All futures, pipes, outlets of water, hold fasts of doors and windows etc. which are required to be built in wall shall be embedded in cement mortar.

**2.4. Joints:**

**2.4.1.** Bricks shall be so laid that all joints are quite flush with mortar. Thickness of joints shall not exposed 12 mm. The face joints shall be raked out as directed by raking tools daily during the progress of work, when the mortar is still green so as to provide key for plaster or pointing to done.

**2.4.2.** The face of brick shall be cleaned the very day on which the work is laid and all mortar dropping removed.

**2.5. Curing:**

**2.5.1.** Green work shall be protected from rain suitably. Masonry work shall be kept moist on all the faces for a period of seven days. The top of masonry work shall be kept well wetted at the close of the day.

**2.6. Preparation of foundation bed:**

**2.6.1.** If the foundation is to be laid directly on the excavated bed, it shall be leveled, cleared of all loose materials, cleaned and wetted before stating masonry, If masonry is to be laid on concrete footing, the top of concrete shall be cleaned and moistened. The contractor shall obtain the engineer's approval for the foundation bed before foundation masonry is started. When pucca flooring is to be provided flush with the top to plinth, the inside plinth offset shall be kept lower than the outside plinth top by the thickness of the flooring.

**2.7.** The frames of doors, windows, cupboards etc. shall be housed into the brick work at the correct location and level as directed. The heavy steel doors, window frames etc. shall be built in with work, but for ordinary steel doors and windows required opening for frames, hold-fasts, etc., shall be in the wall and frame embedded later on in order to avoid damage to the frames.

**2.8.** Necessary scaffolding shall be provided. The supports of the scaffolding shall be sound and strong tied, together with horizontal pieces over which the scaffolding plunks shall be fixed. Simple scaffolding shall be allowed normally. In this case scaffolding hole shall rest in hole header horizontal coarse only. Minimum number of

holes be left in brick work for supporting horizontal scaffolding poles. The contractor is responsible for providing and maintaining sufficiently strong scaffolding so as to withstand all loads likely to come upon it.

- 2.9.** For the face of brick work, where plastering is to be done, joints shall be racked out to a depth not less than thickness of joints. The face of brick work shall be cleaned and mortar dropping removed on very same day that brick work is laid.

**3.0. Mode of measurements & payment**

- 3.1.** The masonry work of G.F. & First floor shall be measured and paid under this item rate includes cost of all materials & labour.
- 3.2.** Brick work in parapet shall be included in the corresponding masonry item of floor immediately below the floor above which the parapet is built.
- 3.3.** No deduction shall be made from quantity of brick work nor any extra payment made for embedding in masonry of marking holes in respect of following item.
- (1) Ends of joints, beams, posts, girders, rafters, purlins trusses corbel, steps, etc. where cross sectional area does not exceed 500 sq.cm.
  - (2) Opening not exceed in 1000 sq.cm.
  - (3) Wall plate sand bed plates bearing of slab, chhajjas, and like whose thickness does not exceed 10 cms. and the bearing does not extend the full thickness of wall.
  - (4) Drainage holes and recesses for cement concrete blocks to embed hold fasts for doors, window etc.
  - (5) Iron fixtures, pipes up to 300 mm. dia. hold fasts of doors, and window built into masonry and pipes etc. for concealed wiring.
  - (6) Forming charges of section not exceeding 350 sq.cm. in masonry.
  - (7) Apparatuses for fire places shall not be deducted nor shall extra labour required to make splaying of jumps, throating and making trenches over the aperture be paid for separately.
- 3.4.** The rate shall be for a unit of one cubic meter.

Item No- 6 Brick work using common burnt clay building bricks having crushing strength not less than 35 kg/ sq. C.M. In foundation and plinth in cement mortar 1:6 ( 1cement : 6 fine sand) in super structure

**Materials**

- 1.1.** Water shall conform to M-1. Cement shall conform to M-3. Sand shall conform to M-6. Grit shall conform to M-8. Graded stone aggregate 20 mm nominal size shall conform to M-12.

- (a) The bars shall be kept in position by the following methods :
- (i) In case of beam and slab construction, sufficient number of precast cover blocks in cement mortar 1:2 (1 cement : 2 coarse sand) about 4 cms. x 4 cms. section and of thickness equal to the specified cover shall be placed between the bars and shattering as to secure and maintain the requisite cover of concrete over the reinforcement. In case of cantilevered or doubly reinforce beams or slabs, the main reinforcing bars shall be held in position by introducing chain spacers or supports bars at 1.0 to 1.2 meter centers.
- 1.2. All bars projecting form pillars, columns, beams, slabs etc, to which other bars and concrete are to be attached of bounded to later on, shall be protected with a coat of thin neat cement grout, if the bars are not likely to be incorporated with succeeding mass of concrete within the following 10 days. This coat of thin neat cement shall be removed before concreting.
- 1.3. The shuttering to be provided shall be of ordinary timber plank and shall conform to M-26.
- 1.4. The dimensions of scantlings and battens shall conform to the design. The strength of the wood shall not be less than that assumed in the design.
- 2.0. **General**
- 2.1. The concrete mix is not required to be designed by preliminary testes. The proportion of the concrete mix shall be 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm. nominal size) by volume concrete work shall have exposed concrete surface or as specified in the item.
- 2.2. The designation ordinary M-100, M-150m M-200, M-250 specified as per I.S. corresponds approximately to 1:3:6, 1:2:4, 1:1:1/2:3 and 1:1:2 nominal mix of ordinary concrete by volume respectively.
- 2.3. The ingredients required for ordinary concrete containing one beg of cement of 50 kg. by weight (0.0342 Cu.M.) for different proportions of mix shall be as under:

**TABLE**

Grade of concrete	Mix by volume	Total quantity of dry aggregates by volume per 50 kg. cement to be taken as sum aggregate of the individual volumes of fine & coarse aggregates, maximum	Proportion of fine aggregate to coarse aggregate	Quantity of water per 50 kg. of cement max.
(1 cubic metre : 1000 Liters)				
1	2	3	4	5
Ordinary	Liters			Liters
M-100	1:3:6	300	Generally 1:2 for fine aggregate to Coarse aggregate by volume but subject to a upper limit of 1:1.1/1 & a lower limit of 1:3.	34
M-150	1:2:4	220		32
M-200	1:1.1/2:3	160		30
M-250	1:1:2	100		27

- 2.4. The water cement ratios shall not be more than specified in the above table. The cement content of the mix specified in the table shall be increased if the quantity of water in mix has to be met eased to overcome the difficulties of placements and compaction so that the water-cement ratio specified in the table is not exceeded.
- 2.5. Workability of the concrete shall be controlled by maintaining a water -cement-ratio that is found to give a concrete mix which is just sufficient wet to be placed and compacted without difficulty with the means available.
- 2.6. The maximum size of coarse aggregate shall be as large as possible within the limits specified but in no case greater than one forth of the minimum thickness of the member provided that the concrete can be placed without difficulty so as to surround all reinforcement thoroughly and to fill the corners of the form.
- 2.7. For reinforced concrete work; coarse aggregates having a nominal size of 20 mm. are generally considered satisfactory.



- 2.8. For heavily reinforced concrete members as in the case of ribs of main beams, the nominal maximum size of coarse aggregate should usually be restricted to 5 mm. less than the minimum clear distance between the main bar or 5 mm. less than the minimum cover to the reinforcement whichever is smaller.
- 2.9. Where the reinforcement is widely spaced as in solid slabs, limitations of size of the aggregate may not be so important, and the nominal maximum size may some times be as great as or greater than the minimum cover.
- 2.10. Admixture maybe used in concrete only with approval of Engineer-in-charge based upon the evidence that with the passage of time neither the compressive strength of concrete is reduced not are other requisite qualities of concrete and steel impaired by the use of such admixtures.

### 3.0. Workmanship

- 3.1. **Proportioning :** Proportioning shall be done by volume, except which shall be measured in terms of bags of 50 kg. weight, the volume of one such bag being taken as 0.0342 cu. meter Boxes of suitable size shall be used for measuring sand aggregate. The size of boxes (internal) shall be 35 x 25 cms. and 40 cms deep while measuring the aggregate and sand the boxes shall be filled without shaking ramming or hammering. The proportioning of sand shall be on the basis of its dry volume and in case of damp saner, allowances for bulk age shall be made.

### 3.2. Mixing :

- 3.2.1. For all work, concrete shall be mixed in a mechanical mixed which along with other accessories shall be kept in first class working condition and so maintained throughout the construction Measured quantity of aggregate, sand and cement required for each batch shall be poured into the claim of the mechanical mixer while it is continuously running. After half a minute of dry mixing measured quantity of water required for each batch of concrete mix shall be added gradually and mixing continued for another one and a half minute Mixing shall be continued till materials are uniformly distributed and uniform colour of the entire mass is obtained and each individual particle of the coarse aggregate shows complete coating of mortar containing its proportionate amount of cement. In no case shall the mixing he done for less than 2 minutes after-oil ingredients have been put into the mixer.
- 3.2.2. When hand mixing is permitted by the Engineer-in-charge for small jobs or for certain other reasons, it shall be done on the smooth watertight platform large enough to allow efficient tuning over the ingredients of concrete before and after adding water Mixing platform shall be so arranged that no foreign malarial gets mixed with concrete nor does the mixing water flow out. Cement in required number of bags shall be spread in n layer of uniform thickness on the mixing platform. Dry coarse and fine aggregate and cement shall then be mixed thoroughly be turning over to get a mixture to uniform colour. Specified quantity water shall then be added gradually through a rose can and the mass turned over till a mix of required consistency is obtained. In hand mixing quantity of cement shall be increased by 10 percent above that specified.
- 3.2.3. Mixers which haw been out of use for more than 30 minutes shall be thoroughly cleaned before putting in a new batch. Unless otherwise agreed to by the Engineer in-charge the first batch of concrete from the mixture shall contain only two thirds of normal quantity of coarse aggregate Mixing plant shall be thoroughly cleaned before changing from one type of cement to another.
- 3.2.4. The form work shall conform to the shape lines and dimensions as shown on the plans and be constructed as to remain sufficiently rigid during the placing and compacting of the concrete. Adequate arrangements shall be made by the contractor toe safe-guard against any settlement of the form-work during the course of concreting and after concreting. The form work of shuttering, centering, scaffolding, bracing etc. shall be as per design.

### 3.3. Clearing and Treatment of forms:

- 3.3.1 All rubbish, particularly chipping shaving and saw dust shall be removed from the interior of the form before the concrete work is placed and the-form in contact with concrete shall be cleaned and thoroughly wetted or treated. The surface shall be then coated with soap solution applied before concreting is done. Soap solution for the purpose shaft prepared by dissolving yellow soap in water to get consistency of paint. Alternatively a coat of raw linseed oil shall be applied after thoroughly cleaning the surface. Care shall be taken that the coating does not get on construction joint surface and reinforced bars.

### 4.0 Stripping time:

- 4.1. In normal circumstances and where ordinary cement is used forms may be struck after expire of following periods.
  - (a) Sides of walls columns and vertical faces of beams.....24 to 48 hours.
  - (b) Beam soffits, (props, left under).....7 days.

- (c) Removal of props slabs:
  - (i) Slabs spanning up to 4.5. m.....7 days.
  - (ii) Spanning over 4.5 mm.....14 days.
- (d) Removal of props t beams and Arches:
  - (i) Spanning up to 6 mm.....14 days.
  - (ii) Spanning over 6 m.....21 days.

## **5.0 Procedure when removing the form work :**

- 5.1.** All form work shall be removed without such shock or vibrations as would damage the reinforced concrete surface. Before the soffits form work and struts are removed, the soffits and the concrete surface shall be exposed where necessary in order to ascertain that the concrete has sufficiently hardened.

## **6.0 Centering:**

- 6.1.** The centering to be provided shall be got approved. It shall be sufficiently strong to ensure absolute safety of the form work and concrete work before, during and after pouring concrete. Watch should be kept to see that behavior or centering and form work is satisfactory during concreting. Erection should also be such that it would allow removal of forms in proper sequence without damaging either the concrete or the forms to be removed.
- 6.2.** The props of centering shall be provided on firm foundation or base of sufficient strength to carry the loads without any settlement.
- 6.3.** The centering and form work shall, be inspected and approved by the Engineer-in-charge before concreting. But this will not relieve the contractor of his responsibility for strength, adequacy and safety of form work and centering. If there is a failure of form work or centering, contractor shall be responsible for the damages to property.

## **7.0 Scaffolding:**

- 7.1.** All scaffolding, hoisting arrangements and ladders etc. required for the facilitating of conceding shall be provided and removed on completion of work by contractor at his own expense. The scaffolding, hoisting arrangements and ladders etc. shall be strong enough to with stand all live, dead and impact loads expected to act and shall be subject to the approval of the Engineer-in-charge. However contractor shall be solely responsible for the safety of the scaffolding, hoisting arrangement, ladders, work and workman etc.
- 7.2.** The scaffolding, hoisting arrangements and ladder shall allow easy approach to the work spot and afford easy inspection.
- 7.3.** The rate is applicable to all condition of working and height up to 4 mts. The rate shall include the cost of materials and labour for various operations involved such as :
  - (a) Splayed edges, notching, allowance for overlaps and passing at angles, battens centering, shuttering propping, bolting, wedging easing, striking and removal.
  - (b) Filleting to form stop chamfered edges or splayed external angles not exceeding 20 mm: width to beams, columns and the like.
  - (c) Temporary openings in the forms for pouring concrete, if required removing rubbish etc.
  - (d) Dressing with oil to prevent adhesion of concrete with shuttering and.
  - (e) Raking or circular cutting.

## **8.0 Re-Use:**

- 8.1.** Before re-use, all form shall be inspected by Engineer-in-charge and their suitability ascertained. The forms shall be scarred, cleaned and joints are gone over, repaired where required. Inside surface shall be retreated to prevent adhesion of concrete.

## **9.0 Consistency:**

- 9.1.** The degree of consistency which shall depend upon the nature of the work and methods of vibration of concrete shall be determined by regular slump tests in accordance with I.S. 1199-193. The slump of 10 mm. to 25 mm shall be adopted when vibrators are used and 80 mm. when vibrators are not used.

## **9.2. Inspection:**

- 9.2.1.** Contractor shall give the Engineer-in-charge due notice before placing any concrete in the forms to permit him to inspect and accept the form work and forms as to their strength, alignment and general fitness but such inspection shall not relieve the contractor of his responsibility for the safety of men machinery materials and for results obtained immediately before concreting all forms shall be thoroughly cleaned.
- 9.2.2.** Centering design and its erection shall be got approved from the engineer-in-charge. One carpenter with helper shall invariably be kept present throughout the period of concreting. Movement of labour

and other persons shall be totally prohibited for reinforcement laid in position. For access to different parts suitable mobile platforms shall be provided so that steel reinforcement in position is not disturbed. For ensuring proper cover, mortar blocks of suitable size shall be cast and tied to the reinforcement. Timber kapachi or metal pieces shall not be used for this purpose.

### **9.3. Transporting and laying:**

- 9.3.1.** The method of transporting and placing concrete shall be as approved. Concrete shall be so transported and placed that no contamination, segregation or loss of its constituent material takes place. All from work shall be cleaned and made free from standing water dust, snow or ice immediately before placing of concrete. No concrete shall be placed in any part of the structure until the approval of the engineer-in-charge has been obtained.
- 9.3.2.** Concreting shall proceed continuously over the area between construction joints. Fresh concrete proper contraction joint is formed. Concrete shall be compacted in its final position within 30 minutes of its discharge from the mixer. Except where otherwise agreed to by the engineer-in-charge, concrete shall be deposited in horizontal layers to a compacted depth of not more than 0.45 meter when internal vibrators are used and not exceeding 0.30 meter in all other cases.
- 9.3.3.** Unless otherwise agreed to by the Engineer-in-charge concrete shall be dropped in to place from a height exceeding 2 meters. When trucking or chutes are used they shall be kept close and used in such a way as to avoid segregation. When concreting has to be resumed on a surface which has hardened, it shall be roughened, swept clean, thoroughly wetted and covered with a 13 mm. thick layer of mortar composed of cement and sand in the same ratio as in the concrete mix itself. This 13 mm. layer of mortar shall be freshly mixed and placed immediately before placing of new concrete. Where concrete has not fully hardened, all laitance shall be removed by scrubbing the wet surface with wire or bristle brushes, care being taken to avoid dislodgement of any particles of coarse aggregate. The surface shall then be thoroughly wetted, all free water removed and then coated with neat cement grout. The first layer of concrete to be placed on this surface shall not exceed 150 mm. in thickness and shall be well rammed against old work, particular attention being given to corners and close spots.
- 9.3.4.** All concrete shall be compacted to produce a dense homogeneous mass with the assistance of vibrators, unless otherwise permitted by the Engineer-in-charge for exceptional cases, such as concreting under water, where vibrators cannot be used. Sufficient vibrators in serviceable condition shall be kept at site so that spare equipment is always available in the event of breakdowns. Concrete shall be judged to be compacted when the mortar fills the spaces between the coarse aggregate and begins to cream up to form an even surface. Compaction shall be completed before the initial setting starts i.e. within 30 minutes of addition of water to dry mixture. During compaction, it shall be observed that needle vibrators are not applied on reinforcement which is likely to destroy the bond between concrete and reinforcement.

### **9.4. Curing:**

Immediately after compaction, concrete weather including rain, running water, shocks, vibration, traffic, rapid temperature changes, frost and drying out process. It shall be covered with wet sacking or Sian or other similar absorbent material approved, soon after the initial set, and shall be kept continuously wet for a period of not less than 14 days from the date of placement. Masonry work over foundation concrete may be started after 48 hours of its laying but curing of concrete shall be continued for a minimum period of 14 days.

### **9.5. Sampling and testing of concrete:**

- 9.5.1.** Samples from fresh concrete shall be taken as per I.S. 1199-1959 and cubes shall be made, cured and tested at 7 days or 28 days as per requirements in accordance with I.S. 526-1959. A random sampling procedure shall be adopted to ensure that each concrete batch shall have a reasonable chance of being tested i.e. the sampling should be spread over the entire period of concreting and cover all mixing units. The minimum frequency of sampling of concrete of each grade shall be in accordance with following :

Quantity of concrete in the work	No of samples	Quantity of concrete in the works	No of samples
1 - 5 Cmt.	1	16-30 Cmt.	3

6 - 15 Cmt.  
51 and above

2  
4± one additional for each additional 50 mm. or part thereof.

31-50 Cmt.

4

**Note :** At least one simple shall be taken from each shift, Ten test specimens shall be made from each sample, five for testing at 7 days and the remaining five at 28 days. The samples of concrete shall be taken on each day of concreting as per above frequency. The number of specimens may be suitably increased as deemed necessary by the Engineer-in-charge when procedure of tests given above reveals a poor quality of concrete and in other special cases.

**9.5.2.** The average of the group of cubes cast for each day shall not be less than the specified cube strength of 150 K/g Cm<sup>2</sup> at 28 days. 20% of the cubes cast for each day may have value less than the specified strength provided the lowest value is not less than 85% of the specified strength. If the concrete made in accordance with the proportions given for a particular grade does not yield the specified strength, such concrete shall be classified as belonging to the appropriate lower grade. Concrete made in accordance with the Proportions given for a particular grade shall not, however be placed in a higher grade on the ground that the test strength are higher than the minimum specified.

## **9.6. Stripping :**

**9.6.1.** The Engineer-in-charge shall be informed in advance by the contractor of his intention to strike the form work. While fixing the time of removal of form work, due consideration shall be given to local conditions, character of the structure, the weather and other conditions that influence the setting of concrete and of the materials used in the mix. In normal circumstances (generally where temperatures are above 20°C) and where ordinary concrete is used, forms may be struck after expiry of periods specified in item No.9.1 (A) for respective item of form work.

**9.6.2.** All form work shall be removed without causing any shock or vibration as would damage the concrete. Before the soft and struts are removed, the concrete surface shall be gradually exposed, where necessary in order to ascertain that concrete has sufficiently hardened. Centering shall be gradually and uniformly lowered in such a manner as to permit the concrete to take stresses due to its own weight uniformly and gradually. Where internal metal tiles are permitted, they or their removable parts shall be extracted without causing any damage to the concrete and remaining holes filled with mortar. No permanently embedded metal part shall have less than 25 mm. cover to the finished concrete surface. Where it is intended to re-use the form work, it shall be cleaned and made good to the satisfaction of the Engineer-in-charge. After removal of form work and shutting, the Executive Engineer shall inspect the work and satisfy by random checks that concrete produced is of good quality.

**9.6.3.** Immediately after the removal of forms, all exposed bolts etc. passing through the cement concrete member and used for shuttering or any other purpose shall be cut inside the cement concrete member to a depth of at least 25 mm. below the surface of the concrete and the resulting holes be filled by cement mortar, all fins, caused by form joints, all cavities produced by the removal of form tiles and all other holes and depressions, honeycomb spots, broken edges or corners and other defects, shall be thoroughly cleaned, saturated with water and carefully pointed and rendered true with mortar of cement and fine aggregate mixed in proportions used in the grade of concrete that is being furnished and of as dry consistency as is possible to use. Considerable pressure shall be applied in filling and pointing to ensure thorough filling in all voids. Surface which are pointed shall be kept moist for a period of 24 hours. If rock pockets/honeycombs in the opinion of the Engineer-in-charge are of such an extent or character as to effect the strength of the structure materially or to endanger the life of the steel reinforcement, he may declare the concrete defective and require the removal and replacement of the portions of structure affected.

## **10.0. Mode of Measurement & Payment**

**10.1.** The consolidated cubical contents of concrete work as specified in item shall be measured. No deduction shall be made for

(a) Ends of dissimilar materials such as joints, beams, posts, girders, girders, purling trusses, corbels and steps etc. up to 500 Sq. Cm. in section.

**10.2.** Form work shall be measured as the area in square meters to shuttering in contact with concrete except in the case of inclined member and portion of curved profile and upper side in which case on area of underside shall be measured for payment.

- 10.3.** Form work to secondary beams shall be measured up to the sides of main beams but no deduction shall be made from the form work of the main beam at the inter section point. No deduction shall be made from the form work of a column at inter section of beams.
- 10.4.** The rate includes cost of all materials labour, tools and plant required for mixing, placing in position, vibrating and compacting, finishing, as directed, curing and all other incidental expenses for producing concrete of specified strength. The rate includes the cost of form work.
- 10.5.** the size of the stone aggregate shall be 10 mm nominal size and the concrete work shall be carried out in 25 mm. thick damp proof course
- 10.6.** The rate shall be for a unit of **one Sq. meter.**

Item no- 7 Providing and laying ordinary Cement concrete 1:1.5:3 (1 Cement 1.5 coarse sand 3 graded stone agg. 20 mm nominal size) for RCC lintel including finishing smooth with curing etc. complete including the cost of formwork but excluding the cost of reinforcement.

**1.0. Materials**

- 1.1.** Water shall conform to M-1. Cement shall conform to M-3. Sand shall conform to M-6. Grit shall conform to M-8. Coarse aggregate shall conform M-12.
- 1.2.** The shuttering to be provided shall be of ordinary timber plank and shall conform to M-26.
- 1.3.** The dimensions of scantlings and battens shall conform to the design. The strength of the wood shall not be less than that assumed in the design.

**2.0. General**

- 2.1.** The concrete mix shall be designed from preliminary tests. The proportion of the concrete mix shall be 1:1.5:3 (1 cement : 1.5 coarse sand : 3 graded stone aggregate 20 mm. nominal size) by volume concrete work shall have exposed concrete surface or as specified in the item.
- 2.2.** The proportioning of cement and aggregates shall be done by weight and necessary precautions shall be taken in the production to ensure that the required work cube strength is attained and maintained. The controlled concrete shall be in grades of M-100, M-150, M-200, M-250, M-300, M-350 & M-400 with prefix controlled added to it. The letter M refers to mix and the numbers specify 28 days works cube compressive strength of 150 mm. cubes of the mix expressed in Kg./cm.
- 2.3.** The proportion of cement, sand and coarse aggregate shall be determined of weight. The weight batch machine shall be used for maintaining proper control over the proportion of aggregates as per mix design. The strength requirements of different grades of concrete shall be as under:

Grade of Concrete	Compressive strength of 15 cms. cubes in kg/cmt. at 28 days, conducted in accordance with I.S. 516-1959.	
	Preliminary test Min.	Work Test Min.
<b>M 150</b>	200	150
<b>M 200</b>	260	200
<b>M 250</b>	320	250
<b>M 300</b>	380	300
<b>M 350</b>	440	350
<b>M 400</b>	500	400

In all cases, the 28 days compressive strength specified in above be the criteria for acceptance or rejection of the concrete. Where the strength of a concrete mix as indicated by tests, lies in

between the strength of any two grades specified in the above table, such concrete shall be classified in for purpose as concrete belonging to the lower of the grades between which its strength lies.

### **3.0. Workmanship**

**3.1.** The proportions for ingredients chosen shall be such that concrete has adequate workability for conditions prevailing on the work question and can be properly compacted with means available except where it can be shown to the satisfaction of the Engineer-in-charge, that supply of properly graded aggregate of uniform quality can be maintained till the completion of work, grading of aggregate shall be controlled by obtaining the coarse aggregates in different sizes and bending them in the right proportions as required. Aggregates of different sizes shall be stocked in separate stock piles. The required quantity of material shall be stock piled several hours, preferably a day before use. The grading of coarse and fine aggregate shall be checked as frequently as possible, the frequency for a given job being determined by Engineer-in-charge to ensure that the suppliers are maintaining the uniform grading as approved for samples used in the preliminary tests.

**3.2.** In proportioning concrete, the quantity of both cement and aggregate shall be determined by weight. Where the weight of cement is determined by accepting the maker's weight per bag, a reasonable number of bags shall be weighted separately to check the net weight. Where cement is weighted from bulk stocks at site and not by bags, it shall be weighed separately from the aggregate. Water, shall either be measured by volume in calibrated tanks or weighed. All measuring equipment shall be maintained in clean and serviceable condition. Their accuracy shall be periodically checked.

**3.3.** It is most important to keep the specified water cement ratio constant and at its correct value. To this end, moisture content in both fine and coarse aggregates shall be determined by the Engineer-in-charge according to the weather conditions. The amount of mixing water shall then be adjusted to compensate for variations in the moisture content. For the determination of moisture content in the aggregates I.S. 2386 (Part-III) shall be referred to. Suitable adjustments shall also be made in the weights of aggregates due to variation in their moisture content. Minimum quantity of cement to be used in controlled concrete shall not be less than 220 kg./m<sup>3</sup> in plain concrete and not less than 250 kg/m<sup>3</sup> in reinforced concrete.

**3.4** The form work shall conform to the shape lines and dimensions as shown on the plans and be constructed as to remain sufficiently rigid during the placing and compacting of the concrete. Adequate arrangements shall be made by the contractor to safe-guard against any settlement of the form-work during the course of concreting and after concreting. The form work of shuttering, centering, scaffolding, bracing etc. shall be as per design.

### **4.0. Clearing and Treatment of forms:**

**4.1.** All rubbish, particularly chipping shaving and saw dust shall be removed from the interior of the form before the concrete work is placed and the-form in contact with concrete shall be cleaned and thoroughly wetted or treated. The surface shall be then coated with soap solution applied before concreting is done. Soap solution for the purpose shall be prepared by dissolving yellow soap in water to get consistency of paint. Alternatively a coat of raw linseed oil shall be applied after thoroughly cleaning the surface. Care shall be taken that the coating does not get on construction joint surface and reinforced bars..

### **5.0 Stripping time:**

**5.1.** In normal circumstances and where ordinary cement is used forms may be struck after expiry of following periods.

(a) Sides of walls columns and vertical faces of beams.....24 to 48 hours.

(b) Beam soffits, (props, left under).....7 days.

(c) Removal of props slabs:

(i) Slabs spanning up to 4.5. m.....7 days.

(ii) Spanning over 4.5 mm.....14 days.

(d) Removal of props t beams and Arches:

(i) Spanning up to 6 mm.....14 days.

(ii) Spanning over 6 m.....21 days.



**6.0 Procedure when removing the form work :**

- 6.1.** All form work shall be removed without such shock or vibrations as would damage the reinforced concrete surface. Before the soffits form work and struts are removed, the soffits and the concrete surface shall be exposed where necessary in order to ascertain that the concrete has sufficiently hardened.

**7.0 Centering:**

- 7.1.** The centering to be provided shall be got approved. It shall be sufficiently strong to ensure absolute safety of the form work and concrete work before, during and after pouring concrete. Watch should be kept to see that behavior or centering and form work is satisfactory during concreting. Erection should also be such that it would allow removal of forms in proper sequence without damaging either the concrete or the forms to be removed.
- 7.2.** The props of centering shall be provided on firm foundation or base of sufficient strength to carry the loads without any settlement.
- 7.3.** The centering and form work shall, be inspected and approved by the Engineer-in-charge before concreting. But this will not relieve the contractor of his responsibility for strength, adequacy and safety of form work and centering. If there is a failure of form work or centering, contractor shall be responsible for the damages to property.

**8.0 Scaffolding:**

- 8.1.** All scaffolding, hoisting arrangements and ladders etc. required for the facilitating of concreting shall be provided and removed on completion of work by contractor at his own expense. The scaffolding, hoisting arrangements and ladders etc. shall be strong enough to withstand all live, dead and impact loads expected to act and shall be subject to the approval of the Engineer-in-charge. However contractor shall be solely responsible for the safety of the scaffolding, hoisting arrangement, ladders, work and workman etc.
- 8.2.** The scaffolding, hoisting arrangements and ladder shall allow easy approach to the work spot and afford easy inspection.
- 8.3.** The rate is applicable to all condition of working and height up to 4 mts. The rate shall include the cost of materials and labour for various operations involved such as :
- (a) Splayed edges, notching, allowance for overlaps and passing at angles, battens centering, shuttering propping, bolting, wedging easing, striking and removal.
  - (b) Filleting to form stop chamfered edges or splayed external angles not exceeding 20 mm: width to beams, columns and the like.
  - (c) Temporary openings in the forms for pouring concrete, if required removing rubbish etc.
  - (d) Dressing with oil to prevent adhesion of concrete with shuttering and.
  - (e) Raking or circular cutting.

**9.0 Re-Use:**

- 9.1.** Before re-use, all form shall be inspected by Engineer-in-charge and their suitability ascertained. The forms shall be scarred, cleaned and joints are gone over, repaired where required. Inside surface shall be retreated to prevent adhesion of concrete.

**10.0 Mode of measurement & payment**

- 10.1.** The consolidated cubical contents of concrete work as specified in item shall be measured. No deduction shall be made for
- (a) Ends of dissimilar materials such as joints, beams, posts, girders, girders, purling trusses, corbels and steps etc. up to 500 Sq. Cm. in section.
- 10.2.** Form work shall be measured as the area in square meters to shuttering in contract with concrete except in the case of inclined member and portion of curved profile and upper side in which case on area of underside shall be measured for payment.
- 10.3.** Form work to secondary beams shall be measured up to the sides of main beams but no deduction shall be made from the form work of the main beam at the inter section point. No deduction shall be made from the form work of a column at inter section of beams.
- 10.4.** The rate includes cost of all materials labour, tools and plant required for mixing, placing in position, vibrating and compacting, finishing, as directed, curing and all other incidental expenses for producing concrete of specified strength. The rate includes the cost of form work.
- 10.5.** The rate shall be for a unit of **one cubic meter**.

Item no. 8 Providing and laying ordinary cement concrete 1:1.5:3 (1 Cement : 1.5 coarse sand : 3 graded stone aggregates 20mm nominal size) and curing complete Including cost of form work in (i) Beam Having cross-sectional area 0.08 to 0.12 sq. m.

**1.0. Materials :** Water shall conform to M-I. Cement shall conform to M-3. Sand shall conform to M-6. Grit shall conform to M-8. Graded stone aggregate 20 mm. nominal size shall conform to M-12.

**2.0. General:**

2.1. The concrete mix is not required to be designed by preliminary tests. The proportion of the concrete mix shall be 1 : 2 :

4 (1 cement: 2 coarse sand ; 4 graded stone aggregate 10 mm. nominal size) by volume.

Concrete work shall have exposed concrete surface or as specified in the item.

2.2. The designation ordinary M-100, M-150, M-200, M-250 specified as per. I.S.

Corresponding approximately to 1 : 3 : 6,

1 : 2 : 4, 1 : 1 1/2 : 3 and 1:1:2 nominal mix of ordinary concrete by volume respectively.

2.3. The ingredients required for ordinary concrete containing one bag of cement of 50 Kg. by weight (0.0342 Cu. M.) for

different proportions of mix shall be as under:

Grade of concrete

Total quantity of dry aggregate by volume

per 50 Kgs. of cement to be taken as the

sum of individual volume of fine and

coarse aggregates, maximum

Proportion of fine aggregate to

coarse aggregate

Quantity of

water per 50 Kgs.

of cement

maximum.

1 2 3 4

M-100 (1 : 3: 6) 300 Liters Generally 1 : 2 for fine aggregate 34 Liters

M-150 (1 : 2 : 4) 2.20 " to coarse aggregate by volume 32 "

M-200 (1 :1 1/2 :3) 160 " but subject to and upper limit 30 "

M-250 ( 1:1:2) 100 " of 1 : 1 1/2 and lower limit 1 : 3 27 "

2.4. The water cement ratios shall not more than those specified in the above table. The cement content of the mix specified

in the Table shall be increased if the quantity of water in a mix has to be increased to overcome the difficulties of placement

and compaction so that the water-cement-ratio specified in the Table is not exceeded.

2.5. Workability of the concrete shall be controlled by maintaining a water-cement-ratio that is bound to give a concrete mix

which is just sufficiently wet to be placed and compacted without difficulty with the means available.

2.6. The maximum size of coarse aggregate shall be as large as possible within the limits specified but in no case greater than



one fourth of the minimum thickness of the member, provided that the concrete can be placed without difficulty so as to surround all reinforcement thoroughly and to fill the corners of the form.

2.7. For reinforced concrete work, coarse aggregates having a nominal size of 20 mm. are generally considered satisfactory.

2.8. For heavily reinforced concrete members as in the case of ribs of main beams, the nominal maximum size of coarse aggregate should usually be restricted to 5 mm. less than the minimum, clear distance between the main bars, or 5 mm. less than the minimum cover to the reinforcement whichever is smaller.

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2.9. Where the reinforcement is widely spaced as in solid slabs, limitations of size of the aggregate may not be important and the nominal maximum size may sometimes be as great as or greater than the minimum cover.

2.10. Admixture may be used in concrete only with approval of Engineer-in-charge based upon the evidence that with the passage of time, neither the compressive strength of concrete is reduced nor are other requisite qualities of concrete and steel impaired by the use of such admixtures.

### **3.0. Workmanship:**

3.1. Proportioning : Proportioning shall be done by volume, except cement which shall be measured in terms of bags of 50

Kg. weight. The volume of one such bag being taken as 0.0342 Cu. metre. Boxes of suitable sizes shall be used for measuring sand aggregate. The size of the boxes (internal) shall be 35 cms. x 25 cms. and 40 Cms. deep. While measuring the aggregate and sand, the box shall be filled without shaking ramming or hammering. The proportioning of sand shall be on the basis of its dry volume and in case of damp sand, allowances for bulkage shall be made.

### **3.2 Mixing:**

3.2.1. For all work, concrete shall "be mixed in a mechanical mixer which alongwith other accessories shall be kept in first class working condition and so maintained throughout the construction. Measured quantity of aggregate, sand, cement required for each batch shall be poured into the drum of the mechanical mixer while it is continuously running. After about half a minute of dry mixing, measured quantity of water required for each batch of concrete mix shall be added gradually and mixing continued for another one and a half minute. Mixing shall be. continued till materials are uniformly distributed and uniform colour of the entire mass is obtained and each individual particle of the coarse aggregate shows complete coating of mortar containing its proportionate amount of cement. In no case shall the mixing be done for less than 2 minutes after all ingredients have been put into the mixer.

3.2.2. When hand mixing is permitted by the Engineer-in-charge for small jobs or for certain other reasons, it shall be done on the smooth watertight platform large enough to allow efficient turning over the ingredients of concrete before and after

adding water. Mixing platform shall be so arranged that no foreign material gets mixed with concrete nor does the mixing water flow out. Cement in required number of bags shall be placed in a uniform layer on top of the measured quantity of fine and coarse aggregate, which shall also be spread in a layer of uniform thickness on the mixing platform. Dry coarse and fine aggregate and cement shall then be mixed thoroughly by turning over to get a mixture of uniform colour. Specified quantity of water shall then be added gradually through a rose-can and the mass turned over till a mix of required consistency is obtained. In hand mixing, quantity of cement shall be increased by 10 percent above that specified.

3.2.3. Mixers which have been out of use for more than 30 minutes shall be thoroughly cleaned before putting in a new batch. Unless otherwise agreed to by the Engineer-in-charge the first batch of concrete from the mixture shall contain only two thirds of normal quantity of coarse aggregate. Mixing plant shall be thoroughly cleaned before changing from one type of cement to another. .

3.3. Consistency: 3.3.1. The degree of consistency which shall depend upon the nature of the work and methods of vibration of concrete, shall be determined by regular slump tests in accordance with I.S. 1199-1959. The slump of 10 mm. to 25 mm. shall be adopted when vibrators are used and 80 mm. when vibrators are not used.

#### **4.4. Inspection:**

3.4.1. Contractor shall give the Engineer-in-charge due notice before placing any concrete in the forms to permit him to inspect and accept the false work and forms as to their strength, alignment, and general fitness but such inspection shall not relieve the contractor of his responsibility for the safety of men, machinery, materials and for results obtained. Immediately before concreting, all forms shall be thoroughly cleaned.

3.4.2. Centering design and its erection shall be got approved from the Engineer-in-charge. One carpenter with helper shall invariably be kept present throughout the period of concreting. Movement of labour and other persons shall be totally prohibited for reinforcement laid in position. For access to different parts, suitable mobile platforms shall be provided so that steel reinforcement in position is not disturbed. For ensuring proper cover, mortar blocks of suitable size shall be cast and tied to the reinforcement. Timber, kapachi or metal pieces shall not be used for this purpose.

#### **3.5. Transporting and laying:**

3.5.1. The method of transporting and placing concrete shall be as approved. Concrete shall be so transported and placed that no contamination segregation or loss of its constituent material takes place.

All form work shall be cleaned and made free from standing water, dust, snow or ice immediately before placing of concrete.

No concrete shall be placed in any part of the structure until the approval of the Engineer-in-charge has been obtained.

3.5.2. Concreting shall proceed continuously over the area between construction joints.

Fresh concrete shall not be placed

against concrete which has been in position for more than 30 minutes unless a proper construction joint is formed. Concrete

shall be compacted in its final position within 30 minutes of its discharge from the mixer.

Except where otherwise agreed to

by the Engineer-in-charge concrete shall be deposited in horizontal layers to a compacted depth of not more than 0.45 metre

when internal vibrators are used and not exceeding 0.30 metre in all other cases.

3.5.3. Unless otherwise agreed to by the Engineer-in-charge, concrete shall not be dropped into place from a height exceeding

2 metres. When trucking or chutes are used they shall be kept close and used in such a way as to avoid segregation. When

concreting has to be resumed on a surface which has hardened, it shall be roughened, swept clean, thoroughly wetted and

covered with a 13 mm. thick layer of mortar composed of cement and sand in the same ratio as in the concrete mix itself. This

13 mm. layer of mortar shall be freshly mixed and placed immediately before placing of new concrete. Where concrete has

not fully hardened, all laitance shall be removed by scrubbing the wet surface with wire or bristle brushes, care being taken

to avoid dislodgement of any particles of coarse aggregate. The surface shall then be thoroughly wetted, all free water

removed and then coated with neat cement grout. The first layer of concrete to be placed on this surface shall not exceed 150

mm. in thickness and shall be well rammed against old work, particular attention being given to corners and close spots.

3.5.4. All concrete shall be compacted to produce a dense homogeneous mass with the assistance of vibrators unless,

otherwise permitted by the Engineer-in-charge for exceptional cases, such as concreting under water, where vibrators cannot

be used. Sufficient vibrators in serviceable condition shall be kept at site so that spare equipment is always available in the

event of breakdowns.

Concrete shall be judged to be compacted when the mortar fills the spaces between the coarse aggregate and begins to cream

up to form an even surface. Compaction shall be completed before the initial setting starts i.e. within 30 minutes of addition

of water to dry mixture. During compaction, it shall be observed that needle vibrators are not applied on reinforcement which

is likely to destroy the bond between concrete and reinforcement.

**3.6. Curing:** Immediately after compaction, concrete shall be protected from weather, including rain, running water, shocks,

vibration, traffic, rapid temperature changes, frost and drying out process. It shall be covered with wet sacking, hessian or

other similar absorbent material approved, soon after the initial set and shall be kept continuously wet for a period of not less

than 14 days from the date of placement. Masonary work over foundation concrete may be started after 48 hours of its laying

but curing of concrete shall be continued for a minimum period of 14 days.

### **3.7. Sampling and Testing of concrete :**

3.7.1. Samples from fresh concrete shall be taken as per I.S. 1199-1959 and cubes shall be made, cured and tested at 7 days or 28 days as per requirements in accordance with I.S. 516-1959. A random sampling procedure shall be adopted to ensure that each concrete batch shall have a reasonable chance of being tested i.e. the sampling should be spread over the entire period of concreting and cover all mixing units. The minimum frequency of sampling of concrete of each grade shall be in accordance with following :

Quantity of concrete in the work No. of samples Quantity of concrete in the works No. of samples

1-5Cmt. 1 16-30Cmt. 3

6-15Cmt. 2 31-50 4

51 and above 4 + one additional for each additional 50 M. or part thereof.

NOTE : At least one sample shall be taken from each shift. Ten test specimens shall be made from each sample, five for testing at 7 days and the remaining five at 28 days. The samples of concrete shall be taken on each day of the concreting as per above frequency. The number of specimens may be suitably increased as deemed necessary by the Engineer-in-charge when procedure of tests given above reveals a poor quality of concrete and in other special cases.

3.7.2. Tire average strength of the group of cubes cast for each day shall not be less than the specified cube strength of 150

Kg/Cm at 28 days. 20% of the cubes cast for each day may have value less than the specified strength provided the lowest value is not less than 85% of the specified strength. If the concrete made in accordance with the proportions given for a particular grade does not yield the specified strength, such concrete shall be classified as belonging to the appropriate lower, grade concrete made in accordance with the proportions given for a particular grade shall not, however, be placed in a higher grade on the ground that the test strength are higher than the minimum specified.

### **3.8. Stripping:**

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3.8.1. The Engineer-in charge shall be informed in advance by the contractor of his intention to strike the form work. While fixing the time for removal of form work, due consideration shall be given to local conditions, character of the structure, the weather and other condition that influence the setting of concrete and pf the materials used in the mix. In normal circumstances (generally where temperatures are above 20 ° C) and where ordinary concrete is used, forms may be struck

after expiry of periods specified in item No. 9.1 (A) for respective item of form work.

3.8.2. All form work shall be removed without causing any shock or vibration as would damage the concrete. Before the soffit

and struts are removed, the concrete surface shall be exposed, where necessary in order to ascertain that the concrete has

sufficiently hardened. Centring shall be gradually and uniformly lowered in such manner as to permit the concrete to take stresses due to its own weight uniformly and gradually. Where internal metal ties are permitted, they or their removable parts shall be extracted without causing any damage to the concrete and remaining holes filled with mortar. No permanently embedded metal part shall have less than 25 mm. cover to the finished concrete surface. Where it is intended to re-use the form work, it shall be cleaned and made good to the satisfaction of the Engineer-in-charge. After removal of form work and shuttering, the Executive Engineer shall inspect the work and satisfy by random checks that concrete produced is of good quality.

3.8.3. Immediately after the removal of forms, all exposed bolts etc., passing through the cement concrete member and used for shuttering or any other purpose shall be cut inside the cement concrete member to a depth of at least 25 mm. below the surface of the concrete and the resulting holes be filled by cement mortar. All fine caused by form joints, all cavities produced by the removal of form ties and all other holes and depressions honeycomb spots, broken edges or corners and other defects shall be thoroughly cleaned, saturated with water and carefully pointed and rendered true with mortar of cement and fine aggregate mixed in the proportions used in the grade of concrete that is-being finished and of as dry consistency as is possible to use. Considerable pressure shall be applied in filling and pointing to ensure thorough filling in all voids. Surfaces which are pointed shall be kept moist for a period of 24 hours.

If rock pockets/honeycombs in the opinion of the Engineer in-charge are of such an extent or character to effect the strength of the structure materially or to endanger the life of the steel reinforcement, he may declare the concrete defective and require the removal and replacement of the portions of the structure affected.

#### **4.0. Mode of measurement and payment:**

4.1. The consolidated cubical contents of concrete work as specified in item shall be measured. The concrete laid in excess of section shown on drawings or as directed shall not be measured. No deduction shall be made for

(a) Ends of dissimilar materials such as joists, beams, posts, girders, rafters, purline trusses, corbels and steps etc upto 500 Sq. Cm. in section.

(b) Opening upto 0.1 Sq. M.

4.2. The rate includes cost of all materials, labour, tools and plant required for mixing, placing, position, vibrating and compacting, finishing, as directed, curing and all other incidental expenses for producing concrete lied strength The rate excludes the cost of form work.

4.3. The rate shall be for a unit of one cubic metre.

Item No- 9 Provdg & laying Ordinary cement concrete 1:1.5:3 (1cement : 1.5 coarse sand 3 graded stone aggregate 20 mm nominal size) and finishing the smooth with curing etc. complete including the cost of formwork but excluding the cost of reinforcement for RCC work in (II) slabs having more than 10 cm and upto 13 cm thickness.

**1.0. Materials :** Water shall conform to M-I. Cement shall conform to M-3. Sand shall conform to M-6. Grit shall conform to M-8. Graded stone aggregate 20 mm. nominal size shall conform to M-12.

**2.0. General:**

2.1. The concrete mix is not required to be designed by preliminary tests. The proportion of the concrete mix shall be 1 : 2 :

4 (1 cement: 2 coarse sand ; 4 graded stone aggregate 10 mm. nominal size) by volume.

Concrete work shall have exposed concrete surface or as specified in the item.

2.2. The designation ordinary M-100, M-150, M-200, M-250 specified as per. I.S.

Corresponding approximately to 1 : 3 : 6,

1 : 2 : 4, 1 : 1 1/2 : 3 and 1:1:2 nominal mix of ordinary concrete by volume respectively.

2.3. The ingredients required for ordinary concrete containing one bag of cement of 50 Kg. by weight (0.0342 Cu. M.) for different proportions of mix shall be as under:

Grade of concrete

Total quantity of dry aggregate by volume per 50 Kgs. of cement to be taken as the sum of individual volume of fine and coarse aggregates, maximum

Proportion of fine aggregate to coarse aggregate

Quantity of water per 50 Kgs.

of cement maximum.

1 2 3 4

M-100 (1 : 3: 6) 300 Liters Generally 1 : 2 for fine aggregate 34 Liters

M-150 (1 : 2 : 4) 2.20 " to coarse aggregate by volume 32 "

M-200 (1 : 1 1/2 :3) 160 " but subject to and upper limit 30 "

M-250 ( 1:1:2) 100 " of 1 : 1 1/2 and lower limit 1 : 3 27 "

2.4. The water cement ratios shall not more than those specified in the above table. The cement content of the mix specified

in the Table shall be increased if the quantity of water in a mix has to be increased to overcome the difficulties of placement

and compaction so that the water-cement-ratio specified in the Table is not exceeded.

2.5. Workability of the concrete shall be controlled by maintaining a water-cement-ratio that is bound to give a concrete mix

which is just sufficiently wet to be placed and compacted without difficulty with the means available.

2.6. The maximum size of coarse aggregate shall be as large as possible within the limits specified but in no case greater than

one fourth of the minimum thickness of the member, provided that the concrete can be placed without difficulty so as to surround all reinforcement thoroughly and to fill the corners of the form.

2.7. For reinforced concrete work, coarse aggregates having a nominal size of 20 mm. are generally considered satisfactory.

2.8. For heavily reinforced concrete members as in the case of ribs of main beams, the nominal maximum size of coarse aggregate should usually be restricted to 5 mm. less than the minimum, clear distance between the main bars, or 5 mm. less than the minimum cover to the reinforcement whichever is smaller.

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2.9. Where the reinforcement is widely spaced as in solid slabs, limitations of size of the aggregate may not be important and the nominal maximum size may sometimes be as great as or greater than the minimum cover.

2.10. Admixture may be used in concrete only with approval of Engineer-in-charge based upon the evidence that with the passage of time, neither the compressive strength of concrete is reduced nor are other requisite qualities of concrete and steel impaired by the use of such admixtures.

### **3.0. Workmanship:**

3.1. Proportioning : Proportioning shall be done by volume, except cement which shall be measured in terms of bags of 50

Kg. weight. The volume of one such bag being taken as 0.0342 Cu. metre. Boxes of suitable sizes shall be used for measuring sand aggregate. The size of the boxes (internal) shall be 35 cms. x 25 cms. and 40 Cms. deep. While measuring the aggregate and sand, the box shall be filled without shaking ramming or hammering. The proportioning of sand shall be on the basis of its dry volume and in case of damp sand, allowances for bulkage shall be made.

### **3.2 Mixing:**

3.2.1. For all work, concrete shall "be mixed in a mechanical mixer which alongwith other accessories shall be kept in first class working condition and so maintained throughout the construction. Measured quantity of aggregate, sand, cement required for each batch shall be poured into the drum of the mechanical mixer while it is continuously running. After about half a minute of dry mixing, measured quantity of water required for each batch of concrete mix shall be added gradually and mixing continued for another one and a half minute. Mixing shall be. continued till materials are uniformly distributed and uniform colour of the entire mass is obtained and each individual particle of the coarse aggregate shows complete coating of mortar containing its proportionate amount of cement. In no case shall the mixing be done for less than 2 minutes after all ingredients have been put into the mixer.

3.2.2. When hand mixing is permitted by the Engineer-in-charge for small jobs or for certain other reasons, it shall be done on the smooth watertight platform large enough to allow efficient turning over the ingredients of concrete before and after

adding water. Mixing platform shall be so arranged that no foreign material gets mixed with concrete nor does the mixing water flow out. Cement in required number of bags shall be placed in a uniform layer on top of the measured quantity of fine and coarse aggregate, which shall also be spread in a layer of uniform thickness on the mixing platform. Dry coarse and fine aggregate and cement shall then be mixed thoroughly by turning over to get a mixture of uniform colour. Specified quantity of water shall then be added gradually through a rose-can and the mass turned over till a mix of required consistency is obtained. In hand mixing, quantity of cement shall be increased by 10 percent above that specified.

3.2.3. Mixers which have been out of use for more than 30 minutes shall be thoroughly cleaned before putting in a new batch.

Unless otherwise agreed to by the Engineer-in-charge the first batch of concrete from the mixture shall contain only two thirds of normal quantity of coarse aggregate. Mixing plant shall be thoroughly cleaned before changing from one type of cement to another. .

3.3. Consistency: 3.3.1. The degree of consistency which shall depend upon the nature of the work and methods of vibration of concrete, shall be determined by regular slump tests in accordance with I.S. 1199-1959. The slump of 10 mm. to 25 mm. shall be adopted when vibrators are used and 80 mm. when vibrators are not used.

#### **4.4. Inspection:**

3.4.1. Contractor shall give the Engineer-in-charge due notice before placing any concrete in the forms to permit him to inspect and accept the false work and forms as to their strength, alignment, and general fitness but such inspection shall not relieve the contractor of his responsibility for the safety of men, machinery, materials and for results obtained. Immediately before concreting, all forms shall be thoroughly cleaned.

3.4.2. Centering design and its erection shall be got approved from the Engineer-in-charge. One carpenter with helper shall invariably be kept present throughout the period of concreting. Movement of labour and other persons shall be totally prohibited for reinforcement laid in position. For access to different parts, suitable mobile platforms shall be provided so that steel reinforcement in position is not disturbed. For ensuring proper cover, mortar blocks of suitable size shall be cast and tied to the reinforcement. Timber, kapachi or metal pieces shall not be used for this purpose.

#### **3.5. Transporting and laying:**

3.5.1. The method of transporting and placing concrete shall be as approved. Concrete shall be so transported and placed that no contamination segregation or loss of its constituent material takes place. All form work shall be cleaned and made free from standing water, dust, snow or ice immediately before placing of concrete.

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No concrete shall be placed in any part of the structure until the approval of the Engineer-in-charge has been obtained.



3.5.2. Concreting shall proceed continuously over the area between construction joints.

Fresh concrete shall not be placed

against concrete which has been in position for more than 30 minutes unless a proper construction joint is formed. Concrete

shall be compacted in its final position within 30 minutes of its discharge from the mixer.

Except where otherwise agreed to

by the Engineer-in-charge concrete shall be deposited in horizontal layers to a compacted depth of not more than 0.45 metre

when internal vibrators are used and not exceeding 0.30 metre in all other cases.

3.5.3. Unless otherwise agreed to by the Engineer-in-charge, concrete shall not be dropped into place from a height exceeding

2 metres. When trucking or chutes are used they shall be kept close and used in such a way as to avoid segregation. When

concreting has to be resumed on a surface which has hardened, it shall be roughened, swept clean, thoroughly wetted and

covered with a 13 mm. thick layer of mortar composed of cement and sand in the same ratio as in the concrete mix itself. This

13 mm. layer of mortar shall be freshly mixed and placed immediately before placing of new concrete. Where concrete has

not fully hardened, all laitance shall be removed by scrubbing the wet surface with wire or bristle brushes, care being taken

to avoid dislodgement of any particles of coarse aggregate. The surface shall then be thoroughly wetted, all free water

removed and then coated with neat cement grout. The first layer of concrete to be placed on this surface shall not exceed 150

mm. in thickness and shall be well rammed against old work, particular attention being given to corners and close spots.

3.5.4. All concrete shall be compacted to produce a dense homogeneous mass with the assistance of vibrators unless,

otherwise permitted by the Engineer-in-charge for exceptional cases, such as concreting under water, where vibrators cannot

be used. Sufficient vibrators in serviceable condition shall be kept at site so that spare equipment is always available in the

event of breakdowns.

Concrete shall be judged to be compacted when the mortar fills the spaces between the coarse aggregate and begins to cream

up to form an even surface. Compaction shall be completed before the initial setting starts i.e. within 30 minutes of addition

of water to dry mixture. During compaction, it shall be observed that needle vibrators are not applied on reinforcement which

is likely to destroy the bond between concrete and reinforcement.

**3.6. Curing:** Immediately after compaction, concrete shall be protected from weather, including rain, running water, shocks,

vibration, traffic, rapid temperature changes, frost and drying out process. It shall be covered with wet sacking, hessian or

other similar absorbent material approved, soon after the initial set and shall be kept continuously wet for a period of not less

than 14 days from the date of placement. Masonry work over foundation concrete may be started after 48 hours of its laying

but curing of concrete shall be continued for a minimum period of 14 days.

### **3.7. Sampling and Testing of concrete :**

3.7.1. Samples from fresh concrete shall be taken as per I.S. 1199-1959 and cubes shall be made, cured and tested at 7 days or 28 days as per requirements in accordance with I.S. 516-1959. A random sampling procedure shall be adopted to ensure that each concrete batch shall have a reasonable chance of being tested i.e. the sampling should be spread over the entire period of concreting and cover all mixing units. The minimum frequency of sampling of concrete of each grade shall be in accordance with following :

Quantity of concrete in the work No. of samples Quantity of concrete in the works No. of samples

1-5Cmt. 1 16-30Cmt. 3

6-15Cmt. 2 31-50 4

51 and above 4 + one additional for each additional 50 M. or part thereof.

NOTE : At least one sample shall be taken from each shift. Ten test specimens shall be made from each sample, five for testing at 7 days and the remaining five at 28 days. The samples of concrete shall be taken on each day of the concreting as per above frequency. The number of specimens may be suitably increased as deemed necessary by the Engineer-in-charge when procedure of tests given above reveals a poor quality of concrete and in other special cases.

3.7.2. Tire average strength of the group of cubes cast for each day shall not be less than the specified cube strength of 150

Kg/Cm at 28 days. 20% of the cubes cast for each day may have value less than the specified strength provided the lowest value is not less than 85% of the specified strength. If the concrete made in accordance with the proportions given for a particular grade does not yield the specified strength, such concrete shall be classified as belonging to the appropriate lower, grade concrete made in accordance with the proportions given for a particular grade shall not, however, be placed in a higher grade on the ground that the test strength are higher than the minimum specified.

### **3.8. Stripping:**

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3.8.1. The Engineer-in charge shall be informed in advance by the contractor of his intention to strike the form work. While fixing the time for removal of form work, due consideration shall be given to local conditions, character of the structure, the weather and other condition that influence the setting of concrete and pf the materials used in the mix. In normal circumstances (generally where temperatures are above 20 ° C) and where ordinary concrete is used, forms may be struck

after expiry of periods specified in item No. 9.1 (A) for respective item of form work.

3.8.2. All form work shall be removed without causing any shock or vibration as would damage the concrete. Before the soffit

and struts are removed, the concrete surface shall be exposed, where necessary in order to ascertain that the concrete has

sufficiently hardened. Centring shall be gradually and uniformly lowered in such manner as to permit the concrete to take stresses due to its own weight uniformly and gradually. Where internal metal ties are permitted, they or their removable parts shall be extracted without causing any damage to the concrete and remaining holes filled with mortar. No permanently embedded metal part shall have less than 25 mm. cover to the finished concrete surface. Where it is intended to re-use the form work, it shall be cleaned and made good to the satisfaction of the Engineer-in-charge. After removal of form work and shuttering, the Executive Engineer shall inspect the work and satisfy by random checks that concrete produced is of good quality.

3.8.3. Immediately after the removal of forms, all exposed bolts etc., passing through the cement concrete member and used for shuttering or any other purpose shall be cut inside the cement concrete member to a depth of at least 25 mm. below the surface of the concrete and the resulting holes be filled by cement mortar. All fine caused by form joints, all cavities produced by the removal of form ties and all other holes and depressions honeycomb spots, broken edges or corners and other defects shall be thoroughly cleaned, saturated with water and carefully pointed and rendered true with mortar of cement and fine aggregate mixed in the proportions used in the grade of concrete that is-being finished and of as dry consistency as is possible to use. Considerable pressure shall be applied in filling and pointing to ensure thorough filling in all voids. Surfaces which are pointed shall be kept moist for a period of 24 hours.

If rock pockets/honeycombs in the opinion of the Engineer in-charge are of such an extent or character to effect the strength of the structure materially or to endanger the life of the steel reinforcement, he may declare the concrete defective and require the removal and replacement of the portions of the structure affected.

#### **4.0. Mode of measurement and payment:**

4.1. The consolidated cubical contents of concrete work as specified in item shall be measured. The concrete laid in excess of section shown on drawings or as directed shall not be measured. No deduction shall be made for

(a) Ends of dissimilar materials such as joists, beams, posts, girders, rafters, purline trusses, corbels and steps etc upto 500 Sq. Cm. in section.

(b) Opening upto 0.1 Sq. M.

4.2. The rate includes cost of all materials, labour, tools and plant required for mixing, placing, position, vibrating and compacting, finishing, as directed, curing and all other incidental expenses for producing concrete lied strength The rate excludes the cost of form work.

4.3. The rate shall be for a unit of one cubic metre.

Item No- 10 Provdg & laying cement concrete 1:1.5:3 (1cement : 1.5 coarse sand :3 graded stone aggregated 20 mm nominal size) and curing complete excluding cost of form work and reinforcement for reinforced concrete work in (A) Foundation, footings, of columns and mass concrete

**1.0. Materials**

**1.1.** Water shall conform to M-1. Cement shall conform to M-3. Sand shall conform to M-6. Grit shall conform to M-8. Coarse aggregate shall conform M-12.

**1.2.** The shuttering to be provided shall be of ordinary timber plank and shall conform to M-26.

**1.3.** The dimensions of scantlings and battens shall conform to the design. The strength of the wood shall not be less than that assumed in the design.

**2.0. General**

**2.1.** The concrete mix shall be designed from preliminary tests. The proportion of the concrete mix shall be 1:1.5:3 (1 cement : 1.5 coarse sand : 3 graded stone aggregate 20 mm. nominal size) by volume concrete work shall have exposed concrete surface or as specified in the item.

**2.2.** The proportioning of cement and aggregates shall be done by weight and necessary precautions shall be taken in the production to ensure that the required work cube strength is attained and maintained. The controlled concrete shall be in grades of M-100, M-150, M-200, M-250, M-300, M-350 & M-400 with prefix controlled added to it. The letter M refers to mix and the numbers specify 28 days works cube compressive strength of 150 mm. cubes of the mix expressed in Kg./cm.

**2.3.** The proportion of cement, sand and coarse aggregate shall be determined of weight. The weight batch machine shall be used for maintaining proper control over the proportion of aggregates as per mix design. The strength requirements of different grades of concrete shall be as under:

**Grade of Concrete**                      **Compressive strength of 15 cms. cubes in kg/cmt. at 28 days, conducted in accordance with I.S. 516-1959.**

	<b>Preliminary test Min.</b>	<b>Work Test Min.</b>
<b>M 150</b>	200	150
<b>M 200</b>	260	200
<b>M 250</b>	320	250
<b>M 300</b>	380	300
<b>M 350</b>	440	350
<b>M 400</b>	500	400

In all cases, the 28 days compressive strength specified in above be the criteria for acceptance or rejection of the concrete. Where the strength of a concrete mix as indicated by tests, lies in between the strength of any two grades specified in the above table, such concrete shall be classified in for purpose as concrete belonging to the lower of the grades between which its strength lies.

**3.0. Workmanship**

**3.1.** The proportions for ingredients chosen shall be such that concrete has adequate workability for conditions prevailing on the work question and can be property compacted with means available except where it can be shown to the satisfaction of the Engineer-in-charge, that supply of properly graded aggregate of uniform quality can be maintained till the completion of work, grading of aggregate shall be controlled by obtaining the coarse aggregates in different sizes and bending them in the right proportions as required. Aggregates of different sizes shall be stocked in separate stock piles. The required quantity of material shall be stock piled several hours, preferably a day before use. The grading of coarse and fine aggregate

shall be checked as frequently as possible, the frequency for a given job being determined by Engineer-in-charge to ensure that the suppliers are maintaining the uniform grading as approved for samples used in the preliminary tests.

- 3.2.** In proportioning concrete, the quantity of both cement and aggregate shall be determined by weight. Where the weight of cement is determined by accepting the maker's weight per bag, a reasonable number of bags shall be weighted separately to check the net weight. Where cement is weighted from bulk stocks at site and not by bags, it shall be weighed separately from the aggregate. Water, shall either be measured by volume in calibrated tanks or weighed. All measuring equipment shall be maintained in clean and serviceable condition. Their accuracy shall be periodically checked.

- 3.3.** It is most important to keep the specified water cement ratio constant and at its correct value. To this end, moisture content in both fine and coarse aggregates shall be determined by the Engineer-in-charge according to the weather conditions. The amount of mixing water shall then be adjusted to compensate for variations in the moisture content. For the determination of moisture content in the aggregates I.S. 2386 (Part-III) shall be referred to. Suitable adjustments shall also be made in the weights of aggregates due to variation in their moisture content. Minimum quantity of cement to be used in controlled concrete shall not be less than 220 kg./m<sup>3</sup> in plain concrete and not less than 250 kg/m<sup>3</sup> in reinforced concrete.

- 3.4** The form work shall conform to the shape lines and dimensions as shown on the plans and be constructed as to remain sufficiently rigid during the placing and compacting of the concrete. Adequate arrangements shall be made by the contractor to safe-guard against any settlement of the form-work during the course of concreting and after concreting. The form work of shuttering, centering, scaffolding, bracing etc. shall be as per design.

#### **4.0. Clearing and Treatment of forms:**

- 4.1.** All rubbish, particularly chipping shaving and saw dust shall be removed from the interior of the form before the concrete work is placed and the-form in contact with concrete shall be cleaned and thoroughly wetted or treated. The surface shall be then coated with soap solution applied before concreting is done. Soap solution for the purpose shall be prepared by dissolving yellow soap in water to get consistency of paint. Alternatively a coat of raw linseed oil shall be applied after thoroughly cleaning the surface. Care shall be taken that the coating does not get on construction joint surface and reinforced bars..

#### **5.0 Stripping time:**

- 5.1.** In normal circumstances and where ordinary cement is used forms may be struck after expiry of following periods.

(a) Sides of walls columns and vertical faces of beams.....24 to 48 hours.

(b) Beam soffits, (props, left under).....7 days.

(c) Removal of props slabs:

(i) Slabs spanning up to 4.5. m.....7 days.

(ii) Spanning over 4.5 m.....14 days.

(d) Removal of props from beams and Arches:

(i) Spanning up to 6 m.....14 days.

(ii) Spanning over 6 m.....21 days.

#### **6.0 Procedure when removing the form work :**

- 6.1.** All form work shall be removed without such shock or vibrations as would damage the reinforced concrete surface. Before the soffits form work and struts are removed, the soffits and the concrete surface shall be exposed where necessary in order to ascertain that the concrete has sufficiently hardened.

#### **7.0 Centering:**

- 7.1.** The centering to be provided shall be got approved. It shall be sufficiently strong to ensure absolute safety of the form work and concrete work before, during and after pouring concrete. Watch should be kept to see that behavior or centering and form work is satisfactory during concreting. Erection should also be such that it would allow removal of forms in proper sequence without damaging either the concrete or the forms to be removed.

- 7.2. The props of centering shall be provided on firm foundation or base of sufficient strength to carry the loads without any settlement.
- 7.3. The centering and form work shall, be inspected and approved by the Engineer-in-charge before concreting. But this will not relieve the contractor of his responsibility for strength, adequacy and safety of form work and centering. If there is a failure of form work or centering, contractor shall be responsible for the damages to property.
- 8.0 **Scaffolding:**
- 8.1. All scaffolding, hoisting arrangements and ladders etc. required for the facilitating of concreting shall be provided and removed on completion of work by contractor at his own expense. The scaffolding, hoisting arrangements and ladders etc. shall be strong enough to with stand all live, dead and impact loads expected to act and shall be subject to the approval of the Engineer-in-charge. However contractor shall be solely responsible for the safety of the scaffolding, hoisting arrangement, ladders, work and workman etc.
- 8.2. The scaffolding, hoisting arrangements and ladder shall allow easy approach to the work spot and afford easy inspection.
- 8.3. The rate is applicable to all condition of working and height up to 4 mts. The rate shall include the cost of materials and labour for various operations involved such as :
  - (a) Splayed edges, notching, allowance for overlaps and passing at angles, battens centering, shuttering propping, bolting, wedging easing, striking and removal.
  - (b) Filleting to form stop chamfered edges or splayed external angles not exceeding 20 mm: width to beams, columns and the like.
  - (c) Temporary openings in the forms for pouring concrete, if required removing rubbish etc.
  - (d) Dressing with oil to prevent adhesion of concrete with shuttering and.
  - (e) Raking or circular cutting.
- 9.0 **Re-Use:**
- 9.1. Before re-use, all form shall be inspected by Engineer-in-charge and their suitability ascertained. The forms shall be scarred, cleaned and joints are gone over, repaired where required. Inside surface shall be retreated to prevent adhesion of concrete.
- 10.0 **Mode of measurement & payment**
- 10.1. The consolidated cubical contents of concrete work as specified in item shall be measured. No deduction shall be made for
  - (a) Ends of dissimilar materials such as joints, beams, posts, girders, girders, purling trusses, corbels and steps etc. up to 500 Sq. Cm. in section.
- 10.2. Form work shall be measured as the area in square meters to shuttering in contract with concrete except in the case of inclined member and portion of curved profile and upper side in which case on area of underside shall be measured for payment.
- 10.3. Form work to secondary beams shall be measured up to the sides of main beams but no deduction shall be made from the form work of the main beam at the inter section point. No deduction shall be made from the form work of a column at inter section of beams.
- 10.4. The rate includes cost of all materials labour, tools and plant required for mixing, placing in position, vibrating and compacting, finishing, as directed, curing and all other incidental expenses for producing concrete of specified strength. The rate includes the cost of form work.
- 10.5. The rate shall be for a unit of **one cubic meter**.

Item No- 11 Provide & laying Ordinary cement concrete 1:1.5:3 (1cement : 1.5 coarse sand 3 graded stone aggregate 20 mm nominal size) and finishing the smooth with curing etc. complete including the cost of formwork but excluding the cost of reinforcement for RCC work in (II) COLUMNS (i) Having cross sectional area 0.05 to 0.08 Sq.M.

#### 1.0. Materials

- 1.1. Water shall conform to M-1. Cement shall conform to M-3. Sand shall conform to M-6. Grit shall conform to M-8. Coarse aggregate shall conform M-12.
- 1.2. The shuttering to be provided shall be of ordinary timber plank and shall conform to M-26.
- 1.3. The dimensions of scantlings and battens shall conform to the design. The strength of the wood shall not be less than that assumed in the design.

## 2.0. General

- 2.1. The concrete mix shall be designed from preliminary tests. The proportion of the concrete mix shall be 1:1.5:3 (1 cement : 1.5 coarse sand : 3 graded stone aggregate 20 mm. nominal size) by volume concrete work shall have exposed concrete surface or as specified in the item.
- 2.2. The proportioning of cement and aggregates shall be done by weight and necessary precautions shall be taken in the production to ensure that the required work cube strength is attained and maintained. The controlled concrete shall be in grades of M-100, M-150, M-200, M-250, M-300, M-350 & M-400 with prefix controlled added to it. The letter M refers to mix and the numbers specify 28 days works cube compressive strength of 150 mm. cubes of the mix expressed in Kg./cm.
- 2.3. The proportion of cement, sand and coarse aggregate shall be determined of weight. The weight batch machine shall be used for maintaining proper control over the proportion of aggregates as per mix design. The strength requirements of different grades of concrete shall be as under:

Grade of Concrete	Compressive strength of 15 cms. cubes in kg/cmt. at 28 days, conducted in accordance with I.S. 516-1959.	
	Preliminary test Min.	Work Test Min.
<b>M 150</b>	200	150
<b>M 200</b>	260	200
<b>M 250</b>	320	250
<b>M 300</b>	380	300
<b>M 350</b>	440	350
<b>M 400</b>	500	400

In all cases, the 28 days compressive strength specified in above be the criteria for acceptance or rejection of the concrete. Where the strength of a concrete mix as indicated by tests, lies in between the strength of any two grades specified in the above table, such concrete shall be classified in for purpose as concrete belonging to the lower of the grades between which its strength lies.

## 3.0. Workmanship

- 3.1. The proportions for ingredients chosen shall be such that concrete has adequate workability for conditions prevailing on the work question and can be properly compacted with means available except where it can be shown to the satisfaction of the Engineer-in-charge, that supply of properly graded aggregate of uniform quality can be maintained till the completion of work, grading of aggregate shall be controlled by obtaining the coarse aggregates in different sizes and bending them in the right proportions as required. Aggregates of different sizes shall be stocked in separate stock piles. The required quantity of material shall be stock piled several hours, preferably a day before use. The grading of coarse and fine aggregate shall be checked as frequently as possible, the frequency for a given job being determined by Engineer-in-charge to ensure that the suppliers are maintaining the uniform grading as approved for samples used in the preliminary tests.
- 3.2. In proportioning concrete, the quantity of both cement and aggregate shall be determined by weight. Where the weight of cement is determined by accepting the maker's weight per bag, a reasonable number of bags shall be weighted separately to check the net weight. Where cement is weighted from bulk stocks at site and not by bags, it shall be weighed separately from the aggregate. Water, shall either be measured by volume in calibrated tanks or weighed.

All measuring equipment shall be maintained in clean and serviceable condition. Their accuracy shall be periodically checked.

- 3.3.** It is most important to keep the specified water cement ratio constant and at its correct value. To this end, moisture content in both fine and coarse aggregates shall be determined by the Engineer-in-charge according to the weather conditions. The amount of mixing water shall then be adjusted to compensate for variations in the moisture content. For the determination of moisture content in the aggregates I.S. 2386 (Part-III) shall be referred to. Suitable adjustments shall also be made in the weights of aggregates due to variation in their moisture content. Minimum quantity of cement to be used in controlled concrete shall not be less than 220 kg./m<sup>3</sup> in plain concrete and not less than 250 kg/m<sup>3</sup> in reinforced concrete.

- 3.4** The form work shall conform to the shape lines and dimensions as shown on the plans and be constructed as to remain sufficiently rigid during the placing and compacting of the concrete. Adequate arrangements shall be made by the contractor to safe-guard against any settlement of the form-work during the course of concreting and after concreting. The form work of shuttering, centering, scaffolding, bracing etc. shall be as per design.

**4.0. Clearing and Treatment of forms:**

- 4.1.** All rubbish, particularly chipping shaving and saw dust shall be removed from the interior of the form before the concrete work is placed and the-form in contact with concrete shall be cleaned and thoroughly wetted or treated. The surface shall be then coated with soap solution applied before concreting is done. Soap solution for the purpose shall be prepared by dissolving yellow soap in water to get consistency of paint. Alternatively a coat of raw linseed oil shall be applied after thoroughly cleaning the surface. Care shall be taken that the coating does not get on construction joint surface and reinforced bars..

**5.0 Stripping time:**

- 5.1.** In normal circumstances and where ordinary cement is used forms may be struck after expiry of following periods.

- (a) Sides of walls columns and vertical faces of beams.....24 to 48 hours.
- (b) Beam soffits, (props, left under).....7 days.
- (c) Removal of props slabs:
  - (i) Slabs spanning up to 4.5. m.....7 days.
  - (ii) Spanning over 4.5 mm.....14 days.
- (d) Removal of props t beams and Arches:
  - (i) Spanning up to 6 mm.....14 days.
  - (ii) Spanning over 6 m.....21 days.

**6.0 Procedure when removing the form work :**

- 6.1.** All form work shall be removed without such shock or vibrations as would damage the reinforced concrete surface. Before the soffits form work and struts are removed, the soffits and the concrete surface shall be exposed where necessary in order to ascertain that the concrete has sufficiently hardened.

**7.0 Centering:**

- 7.1.** The centering to be provided shall be got approved. It shall be sufficiently strong to ensure absolute safety of the form work and concrete work before, during and after pouring concrete. Watch should be kept to see that behavior or centering and form work is satisfactory during concreting. Erection should also be such that it would allow removal of forms in proper sequence without damaging either the concrete or the forms to be removed.

- 7.2.** The props of centering shall be provided on firm foundation or base of sufficient strength to carry the loads without any settlement.

- 7.3.** The centering and form work shall, be inspected and approved by the Engineer-in-charge before concreting. But this will not relieve the contractor of his responsibility for strength, adequacy and safety of form work and centering. If there is a failure of form work or centering, contractor shall be responsible for the damages to property.

**8.0 Scaffolding:**

- 8.1.** All scaffolding, hoisting arrangements and ladders etc. required for the facilitating of conceding shall be provided and removed on completion of work by contractor at his own expense. The



- scaffolding, hoisting arrangements and ladders etc. shall be strong enough to with stand all live, dead and impact loads expected to act and shall be subject to the approval of the Engineer-in-charge. However contractor shall be solely responsible for the safety of the scaffolding, hoisting arrangement, ladders, work and workman etc.
- 8.2.** The scaffolding, hoisting arrangements and ladder shall allow easy approach to the work spot and afford easy inspection.
- 8.3.** The rate is applicable to all condition of working and height up to 4 mts. The rate shall include the cost of materials and labour for various operations involved such as :
- (a) Splayed edges, notching, allowance for overlaps and passing at angles, battens centering, shuttering propping, bolting, wedging easing, striking and removal.
  - (b) Filleting to form stop chamfered edges or splayed external angles not exceeding 20 mm: width to beams, columns and the like.
  - (c) Temporary openings in the forms for pouring concrete, if required removing rubbish etc.
  - (d) Dressing with oil to prevent adhesion of concrete with shuttering and.
  - (e) Raking or circular cutting.
- 9.0 Re-Use:**
- 9.1.** Before re-use, all form shall be inspected by Engineer-in-charge and their suitability ascertained. The forms shall be scarred, cleaned and joints are gone over, repaired where required. Inside surface shall be retreated to prevent adhesion of concrete.
- 10.0. Mode of measurement & payment**
- 10.1.** The consolidated cubical contents of concrete work as specified in item shall be measured. No deduction shall be made for
- (a) Ends of dissimilar materials such as joints, beams, posts, girders, falters, purling trusses, corbels and steps etc. up to 500 Sq. Cm. in section.
- 10.2.** Form work shall be measured as the area in square meters to shuttering in contact with concrete except in the case of inclined member and portion of curved profile and upper side in which case on area of underside shall be measured for payment.
- 10.3.** Form work to secondary beams shall be measured up to the sides of main beams but no deduction shall be made from the form work of the main beam at the inter section point. No deduction shall be made from the form work of a column at inter section of beams.
- 10.4.** The rate includes cost of all materials labour, tools and plant required for mixing, placing in position, vibrating and compacting, finishing, as directed, curing and all other incidental expenses for producing concrete of specified strength. The rate includes the cost of form work.
- 10.5.** The rate shall be for a unit of **one cubic meter**.

Item no- 12 Provi. Providing thermo Mechanically treated bars (TMT bars) confirming to IS 1786 / FC 415 for R.C.C. works including, bending, binding and placing in position complete upto floor 2 level.

Specification for this item shall conform to item no. 5.4.11,

P. 37 of General Technical Specifications for building work except that the thermo mechanically treated bars (TMT) shall be used instead of H.Y.S.D. bars for all floors.

*TMT bar shall conform to IS 1786/FC 415 for R.C.C. work. It shall be purchased from approved manufacturer and necessary proof of purchase shall be submitted. Bars shall be tested in Govt. or Govt. approved laboratory before use. All necessary tests shall be carried out as per instruction of engineer in charge.*

*415 TMT bar shall conform to min 415 Mpa yield strength. Tensile strength of min 600 Mpa and elongation percentage min 22. The chemical composition of bars shall be as below.*

	<i>% Max.</i>
<i>Carbon</i>	<i>0.25</i>
<i>Sulphur</i>	<i>0.05</i>
<i>Phosphorus</i>	<i>0.05</i>
<i>Sulphur and</i>	<i>0.01</i>
<i>Phosphorus</i>	

*Rate shall be for a unit of one kg*

## **2.0. Workmanship :**

2.1. The work shall consist of furnishing and placing reinforcement to the shape and dimensions shown as on the drawings or as directed.

2.2. Steel shall be clean and free from rust and loose mill scale at the time of fixing in position and subsequent concreting.

2.3. Reinforcing steel shall conform accurately to the dimensions given in the bar bending schedules shown on relevant drawings. Bars shall be bent cold to specified shape and dimensions or as directed using a proper bar bender, operated by hand or power to attain proper radius of bends. Bars shall not be bent or straightened in a manner that will injure the material. Bars bent during transport or handling shall be straightened before being used on the work. They shall not be heated to facilitate bending. Unless otherwise specified, a 'U' type hook at the end of each bar shall invariably be provided to main reinforcement. The radius of the bend shall not be less than twice the diameter of the round bar and the length of straight part of the bar beyond the end of the curve shall be at least four times the diameter of the round bar. In case of bars which are not round and in case of deformed bars, the diameter shall be taken as the diameter of circle having an equivalent effective area. The hooks shall be suitably encased to prevent any splitting of the concrete.

2.4. All the reinforcement bars shall be accurately placed in exact position shown on the drawing and shall be securely held in position during placing of concrete by annealed binding wire not less than 1 mm. in size, and by using stay blocks or metal chair spacers, metal hangers, supporting wires or other approved devices at sufficiently close intervals. Bars shall not be allowed to sag between supports nor displaced during concreting or any other operations of the work. All devices used for positioning shall be of non-corrodible material. Wooden and metal supports shall not extend to the surface of concrete, except where shown on drawings. Placing bars on layers of freshly laid concrete as the work progresses for adjusting bar spacing

shall not be allowed. Pieces of broken stone or brick and wooden blocks shall not be used. Layers of bars shall be separated by spacer bars, precast mortar blocks or other approved devices. Reinforcement after being placed in position shall be maintained in a clean condition until completely embedded in concrete. Special care shall be exercised to prevent any displacement of reinforcement in concrete already placed. To prevent reinforcement from corrosion, concrete cover shall be provided as indicated on drawing. All the bars protruding from concrete and to which other bars are to be spliced and which are likely to be exposed for a period exceeding 10 days shall be protected by a thick coat of neat cement grout. .

2.5. Bars crossing each other where required shall be secured by binding wires (annealed) of size not less than 1 mm. in such manner that they do not slip over each other at the time of fixing and concreting.

2.6. As far as possible, bars of full length shall be used. In case this is not possible, overlapping of bars shall be done as directed. When practicable, overlapping bars shall not touch each other, but be kept apart by 25 mm. or 1.25 times the maximum size of the coarse aggregate whichever is greater by concrete between them. Where not feasible, overlapping bars

shall be bound with annealed wires not less than 1 mm. thick twisted tight. The overlaps shall be staggered for different bars and located at points along the span where neither shear nor bending movement is maximum.

2.7. Whenever indicated on the drawings or desired by the Engineer-in-charge, bars shall be joined by couplings which shall have a cross-section sufficient to transmit the full stresses of bars. The ends of the bars that are joined by coupling shall be upset for sufficient length so that the effective cross section at the base of threads is not less than normal cross-section of the

bar. Threads shall be standard threads. Steel for coupling shall conform to I.S. 226.

2.8. When permitted or specified on the drawings, joints of reinforcement bars shall be butt-welded so as to transmit their full stresses. Welded joints shall preferably be located at points when steel will not be subject to more than 75 per cent of the maximum permissible stresses and welds so staggered that at any one section not more than 20 percent of the rods are welded. Only electric arc welding using a process which excludes air from the molten metal and conforms to any or all other special provisions for the work shall be accepted. Suitable means shall be provided for holding bars securely in position during welding. It shall be ensured that no voids are left in welding and when welding is done in two or three stages, previous surface shall be cleaned properly. Ends of the bars shall be cleaned of all loose scale, rust, grease, paint and other foreign matter before welding. Only competent welders shall be employed on the work. The M.S. electrodes used for welding shall conform to I.S. 814. Welded pieces of reinforcement shall be tested. Specimen shall be taken from the actual site and their number and frequency of test shall be as directed.

### 3.0 Mode of measurement and payment

3.1 For the purpose of calculating consumption wastage shall not be permitted beyond 5 percent. Excess consumption over 5 % will be charged at penal rate.

3.2 Reinforcement shall be measured in length including overlaps separately for different diameters as actually used in the work. Where welding or comping is resorted to in place of lap joints such joints shall be measured for payment as equivalent length of overlap as per design requirement from the length so measured the weight of reinforcement shall be calculated in tonnes on the same basis as per M 18 even though steel is supplied to the contractor by the department on actual weight. Length shall include hooks at the end. Wastage and annealed steel wire for binding shall not be measured and the cost of these items shall be deemed to be included in the rate for reinforcement.

3.3 The rate for reinforcement included cost of steel binding wires its carting from department store to work site cutting binding placing, binding & fixing in position as shown on the drawing and as directed. It shall also include. All devices for keeping reinforcement in approved position. Cost of joining as per approved method and all wastage and speller bars.

3.4 The rate shall be for a unit of 1.00 Kg

Item no- 13 Half brick masonry in common burnt clay building bricks having crushing strength not less than 35kg/Sq.Cm in cement mortar 1:4 (1 cement ::4 coarse sand) in foundation and plinth (B) Conventional

### **Materials**

Bricks shall conform to M-15. Water shall conform to M-1. Cement shall conform to M-3. Sand shall conform to M-6. Cement mortar shall conform to M-11.

### **2.0. Workmanship**

- 2.1. Relevant specifications of bricks, wetting and laying of bricks, joints, curing etc shall conform to **Item No. 7** except that the brick work of half brick shall be carried out.
- 2.2. Cement mortar used in masonry work shall be in proportion of 1 part of cement and 4 parts of coarse sand by volume.
- 2.3. All bricks shall be laid stretcher wise, breaking joints with those in the upper and lower courses. The wall shall be taken truly plumb. All courses shall be said truly horizontal and all vertical joints shall be truly vertical. The bricks shall be laid with frogs upwards. A set of masons tools shall be maintained on work as required for frequent checking. After every three course 2 nos. of 6mm mild steel round bars shall be embedded in cement mortar.

### **3.0. Mode of measurement and payment**

- 3.1. The half brick masonry work in [superstructure](#) shall be measured under this item the limiting dimensions shall not exceed those shown in the plan or as directed. Any work done extra over the specified dimensions shall be ignored.
- 3.2. The relevant specifications of **Item No. 7** shall be followed. The length shall be measured nearest to one cm.
- 3.3. The rate includes the cost of providing 2 nos. of 7mm dia. mild steel round bars after every 4th course.
- 3.4. The rate shall be for a unit of one sq. meter.

Item No. 14 Providing 15 mm thick cement plaster in single coat on brick/ concrete walls for interior plastering up to floor two level finished even & smooth in (II) cement mortar (1 cement : 3 sand) Including finishing with a floating coat of neat cement slurry .

**17.58.(I)** 15 mm. thick cement plaster in single coat on fair side of brick concrete walls for interior plastering up to floor two level and finished even and smooth in (i) C.M. 1:3.

**1.0. Materials:** 1.1. Water M-1. The cement mortar of proportion 1 : 3 shall conform to M-13.

### **2.0. Workmanship:**

2.1. Scaffolding : Wooden ballies, bamboos, planks, treaties and other scaffolding shall be sound. These shall be properly examined before erection and use. Stage scaffolding shall be provided for ceiling plaster which shall be independent of the walls.

2.2. Preparation of back-ground:

2.2.1. The surface shall be cleaned of all dust, loose mortar droppings, traces of algae, efflorescence and other foreign matter by water or by brushing. Smooth surface shall be roughened by wire brushing if it is not hard and by racking if it is hard. In case of concrete surface, if a chemical retarder has been applied to the form work, the surface shall be roughened by wire

brushing and all the resulting dust and loose particles cleaned off and care shall be taken that none of the retarders is left on the surface. Trimming of projections on brick/concrete surface where necessary shall be carried out to get an even surface.

2.2.2. Raking of joints in case of masonry where necessary shall be allowed to dry out for sufficient period before carrying out the plaster work.

2.2.3. The work shall not be soaked but only damped evenly before applying the plaster. If the surface becomes dry such area shall be moistened again.

2.2.4. For external plaster, the plastering operation shall be started from top floor and carried downwards. For internal plaster, the plastering operations may be started wherever the building frame and cladding work are ready and the temporary supporting ceiling resting on the wall of the floor have been removed. Ceiling plaster shall be completed before starting plaster to walls.

### **2.3. Applications of plaster :**

2.3.1. The plaster about 15 x 15 cms. shall be first applied horizontally and vertically at not more than 2 metres intervals over the entire surface to serve as gauge. The surfaces of these gauges shall be truly in plane of the finished plastered surface. The mortar shall then be applied in uniform surface slightly more than the specified thickness, then brought to a true surface by working a wooden straight edge reaching across the gauges with small upward and sideways movement at a time. Finally, the surface shall be finished off true with a trowel or wooden float according as a smooth or a sandy granular texture is required. Excessive trowelling or overworking the float shall be avoided. All corners, arrises, angles and junctions be truly vertical or horizontal as the case may be and shall be carefully finished. Rounding or chamfering corners, arrises junctions etc. shall be carried out with proper templates to the size required. 105

2.3.2. Cement plaster shall be used within half an hour after addition of water. Any mortar or plaster which is partially set shall be rejected and removed forthwith from the site.

2.3.3. In suspending the work at the end of the day, the plaster shall be left out clean to the line both horizontally and vertically. When recommencing the plaster, the edges of the old work shall be scraped clean and wetted with cement putty before plaster is applied to the adjacent areas to enable the two to properly join together. Plastering work shall be closed at the end of the day on the body of the wall at least nearer than 15 cm. to any corners or arrises. Horizontal joints in plaster work shall not also occur on parapet tops and copings as these invariably lead to leakage. No portion of the surface shall be left out initially to be packed up later on.

2.3.4. Each coat shall be kept damp continuously till the next coat is applied or for a minimum period of 7 days. Moistening shall commence as soon as plaster is hardened sufficiently. Soaking of walls shall be avoided and only as much water as can be readily absorbed shall be used, excessive evaporation on the sunny or windward side of building in hot air or dry weather shall be prevented by hanging matings or gunny bags on the outside of the plaster and keeping them wet.

### **3.0. Mode of measurements & payment:**

3.1. The rate shall include the cost of all materials, labour and scaffolding etc. involved in the operations described under workmanship.

3.2. All plastering shall be measured in square metres unless, otherwise specified. Length, breadth or height shall be measured correct to a centimetre.

3.3. Thickness of the plaster shall be exclusive of the thickness of the key i.e. grooves or open joints in brick work, stone work etc. or space between laths. Thickness of plaster shall be average thickness with minimum 10mm. at any point on this surface.

3.4. This item includes plastering up to floor two level.

3.5. The measurement of wall plastering shall be taken between the walls or partition (dimensions before plastering being taken) for length and from the top of floor or skirting to ceiling for height. Depth of cover of cornices if any shall be deducted.

3.6. Soffits of stairs shall be measured as plastering on ceilings. Flowing soffits shall be measured separately.

3.7. For jambs, soffits, sills etc. for openings not exceeding 0.5 sq. mt. each in area for ends of joists, beams, posts, girders, steps, etc. not exceeding 0.5 sq. mt. each in area and for openings exceeding 0.5 sq. mt. and not exceeding 3.00 sq. mt. in each area deductions and additions shall be made in the following manner: (a) No deductions shall be made for ends of joints, beams, posts etc. and openings not exceeding 0.5 sq. mt. each and no addition shall be made for reveals, jambs, soffits, sills etc. of these opening for finish to plaster around ends of joints, beamsposts etc.(b) Deduction for openings exceeding 0.5 sq. mt. but not exceeding 3 sq. mt. each shall be made as follows and no additions shall be made for reveals, jambs, soffits, sills etc. of these openings.(i) When both faces of all wall are plastered with same plaster, deduction shall be made for one face only.

(ii) When two faces of wall are plastered with different types of plasters or if one, faces is plastered and the other pointed, deductions shall be made from the plaster or pointing on the side of frame for door, window etc. on which width of reveals is less than that on the other side but no deductions shall be made on the other side. Where width of reveals on both faces of all are equal, deductions of 50% of area of opening on each face shall be made from area of plaster and/or pointing as the casemaybe.

3.8. For openings having door frames equal to projecting beyond the thickness of wall, full deduction for opening shall be made from each plastered face of the wall.

3.9. In case of openings of area above 3 sq. mt. each, deduction shall be made for opening but jambs, soffits and sills shall be measured.

3.10. The rate shall be for a unit of one sq. metre.

Item no. 15 Provdg. 10 mm th. Cement plaster in single coat on brick/concrete walls for interior plastering up to floor two level & finished even & smooth in (1) cement mortar 1:3 (1 cement : 3 sand)

**17.58.(I)** 10 mm. thick cement plaster in single coat on fair side pf brick concrete walls for interior plastering upto floor twolevel and finished even and smooth in (i) C.M. 1:3.

**1.0. Materials:** 1.1. Water M-1. The cement mortar of proportion 1 : 3 shall conform to M-13.

**2.0. Workmanship:**

2.1. Scaffolding : Wooden ballies, bamboos, planks, treaties and other scaffolding shall be sound. These shall be properlyexamined before erection and use. Stage scaffolding shall be provided for ceiling plaster which shall be independent of thewalls.

2.2. Preparation of back-ground:

2.2.1. The surface shall be cleaned of all dust, loose mortar droppings, traces of algae, efflorescence and other foreign matterby water or by brushing. Smooth surface shall be roughened by wire brushing if it is not hard and by racking if it is hard. Incase of concrete surface, if a chemical retarder has been applied to the form work, the surface shall be roughened by wire brushing and all the resulting dust and loose particles cleaned off and care shall be taken that none of the retarders is left onthe surface. Trimming of projections on brick/concrete surface where necessary shall be carried out to get an even surface.

2.2.2. Raking of joints in case of masonry where necessary shall -be allowed to dry out for sufficient period before carryingout the plaster work.

2.2.3. The work shall not be soaked but only damped evenly before applying the plaster. If the surface becomes dry such areashall be moistened again.

2.2.4. For external plaster, the plastering operation shall be started from top floor and carried downwards. For internal plaster, the plastering operations may be started wherever the building frame and cladding work are ready and the temporary supporting ceiling resting on the wall of the floor have been removed. Ceiling plaster shall be completed before starting plaster to walls.

### **2.3. Applications of plaster :**

2.3.1. The plaster about 15 x 15 cms. shall be first applied horizontally and vertically at not more than 2 metres intervals over the entire surface to serve as gauge. The surfaces of these gauges shall be truly in plane of the finished plastered surface. The mortar shall then be applied in uniform surface slightly more than the specified thickness, then brought to a true surface by working a wooden straight edge reaching across the gauges with small upward and sideways movement at a time. Finally, the surface shall be finished off true with a trowel or wooden float according as a smooth or a sandy granular texture is required. Excessive trowelling or overworking the float shall be avoided. All corners, arrises, angles and junctions be truly vertical or horizontal as the case may be and shall be carefully finished. Rounding or chamfering corners, arrises junctions etc. shall be carried out with proper templates to the size required. 105

2.3.2. Cement plaster shall be used within half an hour after addition of water. Any mortar or plaster which is partially set shall be rejected and removed forthwith from the site.

2.3.3. In suspending the work at the end of the day, the plaster shall be left out clean to the line both horizontally and vertically. When recommencing the plaster, the edges of the old work shall be scraped clean and wetted with cement putty before plaster is applied to the adjacent areas to enable the two to properly join together. Plastering work shall be closed at the end of the day on the body of the wall at least nearer than 15 cm. to any corners or arrises. Horizontal joints in plaster work shall not also occur on parapet tops and copings as these invariably lead to leakage. No portion of the surface shall be left out initially to be packed up later on.

2.3.4. Each coat shall be kept damp continuously till the next coat is applied or for a minimum period of 7 days. Moistening shall commence as soon as plaster is hardened sufficiently. Soaking of walls shall be avoided and only as much water as can be readily absorbed shall be used, excessive evaporation on the sunny or windward side of building in hot air or dry weather shall be prevented by hanging matings or gunny bags on the outside of the plaster and keeping them wet.

### **3.0. Mode of measurements & payment:**

3.1. The rate shall include the cost of all materials, labour and scaffolding etc. involved in the operations described under workmanship.

3.2. All plastering shall be measured in square metres unless, otherwise specified. Length, breadth or height shall be measured correct to a centimetre.

3.3. Thickness of the plaster shall be exclusive of the thickness of the key i.e. grooves or open joints in brick work, stone work etc. or space between laths. Thickness of plaster shall be average thickness with minimum 10mm. at any point on this surface.

3.4. This item includes plastering up to floor two level.

3.5. The measurement of wall plastering shall be taken between the walls or partition (dimensions before plastering being taken) for length and from the top of floor or skirting to ceiling for height. Depth of cover of cornices if any shall be deducted.

3.6. Soffits of stairs shall be measured as plastering on ceilings. Flying soffits shall be measured separately.

3.7. For jambs, soffits, sills etc. for openings not exceeding 0.5 sq. mt. each in area for ends of joists, beams, posts, girders, steps, etc. not exceeding 0.5 sq. mt. each in area and for openings exceeding 0.5 sq. mt. and not exceeding 3.00 sq. mt. in each area deductions and additions shall be made in the following manner: (a) No deductions shall be made for ends of joints, beams, posts etc. and openings not exceeding 0.5 sq. mt. each and no addition shall be made for reveals, jambs, soffits, sills etc. of these openings for finish to plaster around ends of joints, beams, posts etc. (b) Deduction for openings

exceeding 0.5 sq. mt. but not exceeding 3 sq. mt. each shall be made as follows and no additions shall be made for reveals, jambs, soffits, sills etc. of these openings. (i) When both faces of all wall are plastered with same plaster, deduction shall be made for one face only.

(ii) When two faces of wall are plastered with different types of plasters or if one face is plastered and the other pointed, deductions shall be made from the plaster or pointing on the side of frame for door, window etc. on which width of reveals is less than that on the other side but no deductions shall be made on the other side. Where width of reveals on both faces of all are equal, deductions of 50% of area of opening on each face shall be made from area of plaster and/or pointing as the case may be.

3.8. For openings having door frames equal to projecting beyond the thickness of wall, full deduction for opening shall be made from each plastered face of the wall.

3.9. In case of openings of area above 3 sq. mt. each, deduction shall be made for opening but jambs, soffits and sills shall be measured.

3.10. The rate shall be for a unit of one sq. metre.

Item No. 16 20 mm thick sand faced cement plaster on walls upto height 10 meters above ground level consisting of 12 mm thick backing coat of C.M.1:3 (1 Cement : 3 sand) and 8 mm thick finishing coat of C.M.1:1 (1 Cement 1 Sand) Watering curing etc. complete.

**17.58.(I)** 20 mm. thick cement plaster in single coat on fair side of brick concrete walls for interior plastering upto floor level and finished even and smooth in (i) C.M. 1:3.

**1.0. Materials:** 1.1. Water M-1. The cement mortar of proportion 1 : 3 shall conform to M-13.

**2.0. Workmanship:**

2.1. Scaffolding : Wooden ballies, bamboos, planks, treaties and other scaffolding shall be sound. These shall be properly examined before erection and use. Stage scaffolding shall be provided for ceiling plaster which shall be independent of the walls.

**2.2. Preparation of back-ground:**

2.2.1. The surface shall be cleaned of all dust, loose mortar droppings, traces of algae, efflorescence and other foreign matter by water or by brushing. Smooth surface shall be roughened by wire brushing if it is not hard and by racking if it is hard. In case of concrete surface, if a chemical retarder has been applied to the form work, the surface shall be roughened by wire brushing and all the resulting dust and loose particles cleaned off and care shall be taken that none of the retarders is left on the surface. Trimming of projections on brick/concrete surface where necessary shall be carried out to get an even surface.

2.2.2. Raking of joints in case of masonry where necessary shall be allowed to dry out for sufficient period before carrying out the plaster work.

2.2.3. The work shall not be soaked but only damped evenly before applying the plaster. If the surface becomes dry such area shall be moistened again.

2.2.4. For external plaster, the plastering operation shall be started from top floor and carried downwards. For internal plaster, the plastering operations may be started wherever the building frame and cladding work are ready and the temporary supporting ceiling resting on the wall of the floor have been removed. Ceiling plaster shall be completed before starting plaster to walls.

**2.3. Applications of plaster :**

2.3.1. The plaster about 15 x 15 cms. shall be first applied horizontally and vertically at not more than 2 metres intervals over the entire surface to serve as gauge. The surfaces of these gauges shall be truly in plane of the finished plastered surface. The mortar shall then be applied in uniform surface slightly more than the specified thickness, then brought to a true surface by working a wooden straight edge



reaching across the gauges with small upward and sideways movement at a time. Finally, the surface shall be finished off true with a trowel or wooden float according as a smooth or a sandy granular texture is required. Excessive trowelling or overworking the float shall be avoided. All corners, arrises, angles and junctions be truly vertical or horizontal as the case may be and shall be carefully finished. Rounding or chamfering corners, arrises junctions etc. shall be carried out with proper templates to the size required. 105

23.2. Cement plaster shall be used within half an hour after addition of water. Any mortar or plaster which is partially set shall be rejected and removed forthwith from the site.

23.3. In suspending the work at the end of the day, the plaster shall be left out clean to the line both horizontally and vertically. When recommencing the plaster, the edges of the old work shall be scraped clean and wetted with cement putty before plaster is applied to the adjacent areas to enable the two to properly join together. Plastering work shall be closed at the end of the day on the body of the wall and nearer than 15 cm. to any corners or arrises. Horizontal joints in plaster work shall not also occur on parapet tops and copings as these invariably lead to leakage. No portion of the surface shall be left out initially to be packed up later on.

23.4. Each coat shall be kept damp continuously till the next coat is applied or for a minimum period of 7 days. Moistening shall commence as soon as plaster is hardened sufficiently. Soaking of walls shall be avoided and only as much water as can be readily absorbed shall be used, excessive evaporation on the sunny or windward side of building in hot air or dry weather shall be prevented by hanging matings or gunny bags on the outside of the plaster and keeping them wet.

### **3.0. Mode of measurements & payment:**

3.1. The rate shall include the cost of all materials, labour and scaffolding etc. involved in the operations described under workmanship.

3.2. All plastering shall be measured in square metres unless, otherwise specified. Length, breadth or height shall be measured correct to a centimetre.

3.3. Thickness of the plaster shall be exclusive of (the thickness of the key i.e. grooves or open joints in brick work, stone work etc. or space between laths. Thickness of plaster shall be average thickness with minimum 10mm. at any point on this surface.

3.4. This item includes plastering upto floor two level.

3.5. The measurement of wall plastering shall be taken between the walls or partition (dimensions before plastering being taken) for length and from the top of floor or skirting to ceiling for height. Depth of cover of cornices if any shall be deducted.

3.6. Soffits of stairs shall be measured as plastering on ceilings. Flying soffits shall be measured separately.

3.7. For jambs, soffits, sills etc. for openings not exceeding 0.5 sq. mt. each in area for ends of joists, beams, posts, girders, steps, etc. not exceeding 0.5 sq. mt. each in area and for openings exceeding 0.5 sq. mt. and not exceeding 3.00 sq. mt. in each area deductions and additions shall be made in the following manner: (a) No deductions shall be made for ends of joints, beams, posts etc. and openings not exceeding 0.5 sq. mt. each and no addition shall be made for reveals, jambs, soffits, sills etc. of these opening for finish to plaster around ends of joints, beams posts etc. (b) Deduction for openings exceeding 0.5 sq. mt. but not exceeding 3 sq. mt. each shall be made as follows and no additions shall be made for reveals, jambs, soffits, sills etc. of these openings. (i) When both faces of all wall are plastered with same plaster, deduction shall be made for one face only.

(ii) When two faces of wall are plastered with different types of plasters or if one, faces is plastered and the other pointed, deductions shall be made from the plaster or pointing on the side of frame for door, window etc. on which width of reveals is less than that on the other side but no deductions shall be made on the other side. Where width of reveals on both faces of all are equal, deductions of 50% of area of opening on each face shall be made from area of plaster and/or pointing as the case may be.

3.8. For openings having door frames equal to projecting beyond the thickness of wall, full deduction for opening shall be made from each plastered face of the wall.

- 3.9. In case of openings of area above 3 sq. mt. each, deduction shall be made for opening but jambs, soffits and sills shall be measured.
- 3.10. The rate shall be for a unit of one sq. metre.

Item No- 17 Providing and laying Vitrified tiles 8 to 10 mm thick in skirting risers of steps and dedo on 10 mm thick cement plaster 1:3 (1 Cement 3 coarse sand) and jointed with white cement slurry

**1.0. Materials**

Water shall conform to M-1. Cement mortar shall conform to M-11. **Vitrified flooring tiles** shall conform to ISO 13006. The size, thickness and shade & quality of vitrified tiles shall be got approved from Engineer in charge before use.

**2.0. Workmanship**

**2.1. Preparation of Surface:**

In case of brick masonry wall, the joints shall be raked out to a depth of least 10 mm. while the masonry is being laid. In case of concrete wall the surface shall be chiseled and roughed with wire brushes. The surface shall be cleaned and wetted thoroughly before commencing the laying work.

**2.2. Laying ;**

**2.2.1.** The wall surface shall be covered with 10 mm. thick plaster of cement mortar 1:3 mix and allowed to harden. The plaster shall be roughened with wire brushes both way. The back of tiles shall be floated with grey cement slurry set and edges with white cement slurry in bedding mortar. The tiles shall be gently tapped in position on after the other keeping the joints as thin as possible. Top of skirting or dedo shall be truly horizontal and the joints vertical or as per required pattern.

**2.2.2.** Risers of steps, skirting and dedo shall rest on top of treads or flooring. Where full size tiles cannot be fixed. They shall be cut to the required size and the edges be smoothened.

**2.2.3.** The joints shall be cleaned and flush pointed with white cement. The surface shall be kept wet for seven days. After curing the surface shall be washed clean.

**3.0. Mode of measurements and payment**

**3.1.** The rate shall include the cost of all materials and labour required for various operations described above.

**Risers of steps :** skirting and dedo shall be measured in square meters, length and height shall be measured along the finished face of the skirting or dedo including curves, where special such as covers internal and external angles, etc. used. The length and height shall be measured correct to the centimeter except in case of risers and skirting where height shall be measured correct to 3 mm.

**3.2.** The rate shall be for a unit of one sq. meter.

Item No. 18 Providing and laying 24" x 24" Vitrified 8 mm thick Tile flooring over 20 mm (Avg) base of C.M. 1:6 on new surface or fixing on Extg. Flooring by adhesive material incl. Dismantling of extg. Flooring & jointed with colour cement slurry finished with flush pointing & cleaning the surface etc. complete for antiskit

**1.0. Materials**

Water shall conform to M-1. Cement mortar shall conform to M-11. **Vitrified flooring tiles** shall conform to ISO 13006. The size, thickness and shade & quality of vitrified tiles shall be got approved from Engineer in charge before use.

**2.0. Workmanship**

**2.1. Preparation of Surface:**

In case of brick masonry wall, the joints shall be raked out to a depth of least 10 mm. while the masonry is being laid. In case of concrete wall the surface shall be chiseled and roughed with wire brushes. The surface shall be cleaned and wetted thoroughly before commencing the laying work.

**2.2. Laying ;**

**2.2.1.** The wall surface shall be covered with 10 mm. thick plaster of cement mortar 1:3 mix and allowed to harden. The plaster shall be roughened with wire brushes both way. The back of tiles shall be floated with grey cement slurry set and edges with white cement slurry in bedding mortar. The tiles shall be gently tapped in position on after the other keeping the joints as thin as possible. Top of skirting or dedo shall be truly horizontal and the joints vertical or as per required pattern.

**2.2.2.** Risers of steps, skirting and dedo shall rest on top of treads or flooring. Where full size tiles cannot be fixed. They shall be cut to the required size and the edges be smoothened.

**2.2.3.** The joints shall be cleaned and flush pointed with white cement. The surface shall be kept wet for seven days. After curing the surface shall be washed clean.

**3.0. Mode of measurements and payment**

- 3.1.** The rate shall include the cost of all materials and labour required for various operations described above.

**Risers of steps :** skirting and dedo shall be measured in square meters, length and height shall be measured along the finished face of the skirting or dedo including curves, where special such as covers internal and external angles, etc. used. The length and height shall be measured correct to the centimeter except in case of risers and skirting where height shall be measured correct to 3 mm.

- 3.2.** The rate shall be for a unit of one sq. meter.

Item No. 19 : Providing & laying broken china mosaic flooring for terrace using 12 mm to 20 mm broken pieces of glazed tiles to be laid over cement mortar 1:3 in plain or slope and to be tempered to bring mortar crême out up to surface using white cement including rounding off junction and extending them up to 15 cm along the well cleaning with water and oxalic acid as directed.

#### **1.0 MATERIAL - WATER**

- 1.1 Water shall not be salty brackish and shall be clean, reasonably clear and free objectionable quantities of silt and traces of oil injurious alkalis salts organic matter and other deleterious material which will either weaken the mortar or concrete or cause efflorescence or attack the steel in R.C.C. container for transport storage and huddling of water shall be clean. Water shall conform to the Standard Specification in I.S. 455 - 1978.
- 1.2 If required by the Engineer in charge, it shall be tested by comparison with distilled water compression shall be made by means of standard cement tests for soundness, time of setting and mortar strength as specified in I.S. 269 - 1976. Any indication of unsoundness change in time of setting by 50 minutes or more or decrease of more than 10 percent strength of mortar prepared with distilled water sample when compared with the result obtained with mortar prepared with distilled water shall be sufficient cause for rejection of water under test.
- 1.3 Water for curing, mortar concrete or masonry should not be too acidic/too alkaline.
- 1.4 It shall be free of elements which significantly affect the hydration reaction or otherwise interface with the hardening of mortar or concrete during curing or those which produce objectionable stains or other unsightly deposits on concrete or mortar surfaces.
- 1.5 Hard and bitter water shall not be used for curing.
- 1.6 Potable water will generally found suitable for curing mortar or concrete.

#### **2.0 CEMENT**

- 2.1 Cement shall be ordinary Portland slag cement as per I.S. 1624 - 1974 or Portland slag cement as per I.S.455-1976.
- 2.2 Cement shall be stored above the ground level in perfectly and dry and water tight sheds. Wherever bulk storage containers are used, there capacity should be sufficient to cater to the requirements at site and should be cleaned at least once every 3 to 4 months. The aggregate shall be stored in such a way as to prevent admixture of foreign materials. Different size of fine or coarse aggregate shall be stored in separate stock piles sufficiently away from the each other to prevent inter mixing the materials.

### 3.0 SAND

- 3.1 Sand shall be natural sand, clean, well graded, hared, strong, durable and gritty particular free from immures amounts of dust, clay, kankar, modules, soft or flaky particles shall alkali salts, organic matter, learn mica or other deleterious substance and shall be got approved from the Engineer in charge. The sand shall not contain more than 8 percent of slit as determined by field test if necessary, the sand

**COARSE SAND** - The fineness modules of coarse sand shall not be less than 2.5 and shall not exceed 3.0. The sieve analysis of coarse sand be as under :

I.S. Sieve Designation	% by wt. passing
4.75 mm	100
2.36 mm	90 to 100
1.18 mm	70 to 100
600 MC	30 to 100
300 MC	85 to 70
150 MC	00 to 50

- 3.2 **FINE SAND** : The fineness modules shall not exceed 1.0 the sieve analysis of fine sand be as under:

I.S. Sieve Designation	% by wt. passing
4.75 mm	100
2.36 mm	100
1.18 mm	70 to 100
600 MC	40 to 85
300 MC	05 to 50
150 MC	00 to 10

- 3.3 Materials shall be stored as to prevent their deterioration of their quality and fitness for the work. Any material which has deterioration or has been damaged or is otherwise considered defective by the Engineer in charge shall not be used in the work.

### 1.4 WATER PROOFING COMPOUND

Water proofing compound shall be of approved quality and make as approved by Engineer in charge.

### **1.5 BRICK BATS**

Brick bat aggregates shall be broken from well burnt or slightly over burnt and dense bricks it shall be homogeneous in texture roughly cubical in shape clean and free from dirt or any other foreign material brick bats shall be of 40 to 50 mm nominal size unless otherwise specified in the item the under burnt or over burnt bricks bats shall not be used.

### **1.6 CHINA MOSAIC TILE PIECES**

China mosaic tiles pieces shall be of 50 mm to 90 mm nominal size, tiles pieces shall be made from hard and good quality of tiles.

### **1.7 WHITE CEMENT**

White cement shall be of approved make it shall confirm definition of I.S. 8042-E-1978 the sample of white cement shall be approved by Engineer in charge.

### **WORKMANSHIP**

**A** First of all surface of the entire terrace shall be cleaned by thoroughly brooming and then by wire brushes. All the loose material, dust and debries shall be removed thoroughly from the entire surface of the terrace.

All joints and cracks shall be racked off and cut in trench which shall be filled by neat cement slurry admixed with water proofing compound. The joints with parapet shall be racked up to 30 cm height and shall be applied by neat cement slurry admixed with water proofing compound.

Neat cement slurry shall be prepared and a water proofing compound of approved make shall be mixed with the slurry in proportion specified by the manufacturer of the compound and shall be laid through out the surface of the terrace by the use of brushes mala etc. Cement slurry shall be prepared by adding adequate quantity of water so as to spread it uniformly on the surface.

**B** Cement concrete 1:5:10 (Using 50% of cement mortar 1:5, 1 part of cement and 5 part of coarse sand by volume admixed with water proofing compound of approved make in specified proportion). Of specified thickness shall be laid (Specification of C.C. 1:5:10 shall be followed for the execution of this layer) all over the surface of the terrace in true level and required slope including rounding of junctions of walls and slabs.

**C** After two days of proper curing applying a second coat of cement slurry on entire surface of the terrace.

**D** The entire surface shall be finished with 20 mm thick C.M. 1:4 and China mosaic tilling in true level and slope as directed by Engineer in charge and finally finishing the surface with trowel with white cement slurry (Specification of white glazed tiles flooring shall be followed for the execution of this item).

- E** Finishing the surface with 20 mm thick C.M. 1:4 and China mosaic tiling and finally finishing the surface with trowel with white cement slurry.
- F** After two days proper curing the terrace shall be flooded for 15 days.
- 7.0 MODE OF MEASUREMENT AND PAYMENT**
- 7.1** The unit rate of flooring shall include the cost of all materials, tools and plant required for mixing, laying of base layer in true level and slope as required applying and placing broken pieces of china mosaic tile in position, compacting, finishing, curing, providing treatment of 30 cm high allover the length of parapets and corners and sill of doors etc. and all other incidental expenses for producing flooring work to complete the structure of its components as shown on the drawings and according to these specifications. They shall also include the cost of making, fixing of all scaffolding and forms required for the work.
- The rate of plastering shall include the cost of all labour, materials, tools and plants, scaffolding and all incidental expenses as described herein above.
- 7.2** The plaster work shall be measured for its length and width, limiting dimensions to those specified on plan or as directed. The rate shall be for a unit of one Square Meter.
- 7.4** [A guarantee bond on appropriately stamped paper shall be given by the contractor to the Department in the manner and form prescribed below.](#)
- 7.5** The payment will be made on **Square Meter** basis of the finished work.

## FORM OF GUARANTEE BOND

Contractor I / We \_\_\_\_\_) here by guarantee that work will remain unaffected and will not be in anyway damaged by water rain and will not leak from surface for a period for 5 years after completion of the work of water proofing treatment as per the terms and conditions of the contract and damage that might be caused on account of water rain and or other similar type of dampness or leakage from walls or above floor.

The guarantee shall remain in force for the period of 5 years from the completion of the work under the contract and it shall remain binding to the contractor for period of 5 years.

The deposit at the rate of 20% of the cost of this item from the running and final bills shall be recovered and remained for the first one year after completion of the work or at least on monsoon season passed whichever is later and 10% shall be retained for the balance of the guarantee period and shall be returned only after completion of the guarantee period.

## MODE OF MEASUREMENT AND PAYMENT

The length and breadth shall be measured correct to cm. as per the dimension of the sanctioned plants. No deduction shall be made not extra for paid for any opening for pipes etc. upto 0.1 sq.mt. The rate shall include the cost of all labour and materials required for the operation involved. For satisfactory completion.

Item No- 20 Provdg. & laying white glazed tiles 6 mm th. In flooring, treads of steps & landings laid on a bed of 12 mm th. Cement mortar 1:3 (1cement : 3 coarsesand finished with flush pointing in white cement.

**14.29.** White glazed tiles 6 mm. thick in flooring treads of steps and landings laid on a bed of 12 mm. thick cement mortar 1:3 (1 cement: 3 coarse sand) finished with flush pointing inwhite cement.

**1.0. Materials :** Water shall conform to M-I. Cement mortar shall conform to M-11. White glazed tiles shall conform to M-55.

### **2.0. Workmanship:**

#### **2.1. Bedding:**

2.1.1. The sub-grade shall be cleaned, wetted and mopped- The bedding shall then be laid evenly over the surface tamped and corrected to desired level and allowed to harden enough to offer a rigid cushion to tiles and to enable the mason to place wooden planks across and squat on it.

2.1.2. The white glazed tiles shall be laid on cement mortar bedding of 12 mm. thick in C.M. 1 : 3 The mortar shall have sufficient plasticity for laying and there shall be no hard lumps that would interfere with the evenness of bedding. The base shall be cleared and well wetted. The mortar shall then be spread in thickness not less than 10 mm. at any place and average 12 mm. thickness. The proportion of the cement mortar shall be as specified in the item.

#### **2.2. Fixing tries:**

2.2.1. The tiles before laying shall be soaked in water for atleast two hours. Neat grey cement grout at 3.3. Kg/Cement/Sq. mt. of honey like consistency shall be spread bver the mortar bedding as directed. The edges of the tiles be smeared with neat cement slurry. The tiles shall be well pressed and gently tapped with a wooden mallet till they are properly bedded and in level with the adjoining tiles. There shall be no hollows in bed or joints. The joints between the tiles shall be as thin as possible in straight line or as per pattern.

2.2.2. The tiles shall not have staggered joints. The joints shall be true to centre line both ways. The Nehni trap coming in the flooring shall be so positioned that its grating shell replace only one tile as far as possible. Where full size tiles cannot be fixed, they shall be cut (Swan) to the required size and the edges rubbed smooth to ensure straight and true joints. The joints shall be filled with grey cement grout with wire brush of trowel to a depth of 5 mm. and loose material removed. White cement shall be used for pointing the joints. After fixing the tile finally in an even plane the flooring shall be kept wet and allowed to nature undisturbed for 7 days.

**2.3. Cleaning: 2.3.1.** The surplus cement grout that may have come out of the joints shall be cleared off before it sets. Once the floor has set, it shall be carefully washed, cleared by dilute acid and dried. Proper precaution and measures shall be taken to ensure that the tiles are not damaged inany way till the completion of the construction.

### **3.0. Mode of measurements & payment:**

3.1. The work done shall be measured in sq. mt. for visible area of work done. The length and width of the flooring shall be measured not between the faces of skirting or dedos or plastered face of wall as the case may be. The paving under dado or skirting shall not be measured. No deduction shall be made nor extra paid for any opening in the floor of area upto 0.1 sq. mt. Nothing extra shall be paid for laying the floors at different levels in the same rooms.

3.2. The rate shall be for a unit of one sq. metre.



Item No- 21 Providing and Fixing Door having granite frame flat edge polished with standard extruded coloured anodized aluminum section frame outer size 127mm \* 38.1mm \* 1.35mm (weight 1.384 Kg/rmt) side hung Double shutter having factory fabricated std.actory made 50 mm thick flush door both side laminated with S.S. Handle size 60 cm long. and SS fixtures & fasnings. as per details colour and pattern approved by architech including necessary stainless steel fixtures and fastenings. etc. complete.

**1.0. Materials:** Indian teak wood for shutters shall conform to M-29. Glass shall conform to M-38.

(A) Plywood shall conform to M-37.

(B) Particle board shall conform to M-40. Anodised aluminium bull hinges shall conform to M-43.

(C) Hard board shall of best quality and shall be as approved by Engineer-in-charge.

(D) A.C. sheet shall conform to M-24.

**2.0. Workmanship:**

2.1. The relevant specifications of item No. 10.12 (A) (I) shall apply to this item except that the work is shuttered with (A) plywood (B) partical board (C) hard board panels (D) A.C. sheets panels as specified in item.

2.2. The shutters shall be prepared by fitting styles and rails (lop, bottom, lock and frieze) as for panelled leaves with simple chamfer on edges only. The styles and rails shall be grooved with just sufficient width for received panels and plain panels

of specified type panels shall be filled into the grooves.

**3.0. Mode of measurements & payment:**

3.1. The relevant specifications of item No. 10.12 (A) (I) shall be followed.

3.2. The rate shall be for a unit of one sq. metre.

Item No. 22 Providingg and fixing extruded aluminium windows having extruded aluminium colour anodized section frame main outer size 95 mm x 24 mm x 1.17 mm (of jindal section No. 2459 @ Wt. 0.738 Kg/ mt) horizontal four trak member size 92 mm x 31.75 mm x 1.30 mm (of jindal section No. 8688@ Wt. 1.07Kg/ mt) vertical member of size 92 mm x 31.75 mm x 1.50 mm (of jindal section No. 8933 @ Wt.1.06 Kg/ mt) with sliding shutters of horizontal member size 40 mm x 18 mm x 1.29 mm (of Jindal Section no. 8947 @ wt. of 0.456 Kg/ mt) Vertical member of size 40 mm x 18 mm x 1.29 mm ( of Jindal section No. 8949 @ Wt. of 0.456 Kg/ mt) with 5 mm thick transparent bronze colour tinted float glass with powder coated aluminium silicon sealant glass fixing to frame as per details etc. complete.

**1.0 MATERIAL**

**1.1 Aluminum standard section**

**1.1.1 Main outer frame of rectangular tube**

Aluminum alloy used in the manufacture of extruded Window section shall confirm to I S designation HEA-WP of I S 733-1975 and also Designation WVG –WP of I S 1285-1975 section shall be as specified in the drawing and design

Size of the **rectangular tube** shall confirm **65.0 x 25.0 X 1.25 mm**

All sections shall be Free from any scratches or holes or any damages on surface. All section shall have finished luster surface on all sides

#### **1.1.2. Two track channel frame for window portion**

Aluminum alloy used in the manufacture of extruded Window section shall confirm to I S designation HEA-WP of I S 733-1975 and also Designation WVG –WP of I S 1285-1975 section shall be as specified in the drawing and design

Size of the **two track Channel** shall confirm **65.0 x 25.0 X 1.25 mm**

All channels shall be Free from any scratches or holes or any damages on surface. All section shall have finished luster surface on all sides

#### **1.1.3 Window shutter frame of size 50 X 25 x 1.5 mm**

Aluminum alloy used in the manufacture of extruded Window section shall confirm to I S designation HEA-WP of I S 733-1975 and also Designation WVG –WP of I S 1285-1975 section shall be as specified in the drawing and design

Size of the **frame** shall confirm **50 X 25 x 1.5 mm**

All sections shall be Free from any scratches or holes or any damages on surface. All section shall have finished luster surface on all sides

#### **1.1.4 PVC two track rubber top and bottom sliding channel**

Top and bottom channel of rubber shall be of approved make and quality and shall be Free from any scratches or holes or any damages on surface.

All channels shall have finished luster surface on all sides

### **1.3 Glass**

The glass shall be of approved make having thickness of 5 mm The glass shall be clear and free from scratches and cracks The glass shall be provided on the top

### **1.5. Rubber Gasket**

Rubber gasket shall be of approved make. shall be Free from any scratches or holes or any damages on surface. and shall have finished luster surface on all sides

### **1.6. Fixtures**

#### **1.6.1 Hinges,**

Hinges shall be of approved make. shall be Free from any scratches or holes or any damages on surface. and shall have finished luster surface on all sides

#### **1.6.2 Handles,**

handles shall be of approved make. shall be Free from any scratches or holes or any damages on surface. and shall have finished luster surface on all sides

#### **1.1.4 Bolts,**

All bolts shall be of approved make. shall be Free from any scratches or holes or any damages on surface. and shall have finished luster surface on all sides

#### **1.6.5 Stoppers,**

stoppers shall be of approved make. shall be Free from any scratches or holes or any damages on surface. and shall have finished luster surface on all sides

### **2.0 WORKMANSHIP**

The Work of aluminum window shall be done with extreme finishing. The partial board shall be fixed in the bottom panel and glass shall be fitted on top panel as directed by Engineer in charge using glazing clips and rubber gaskets as required All the fixtures and fastenings shall be fitted at right place and as directed by Engineer in charge. Floor spring shall be fitted properly so as to align the window properly and shall be given trial of opening and closing properly.

#### **3.0 Mode of Measurement & Payment :**

**3.1.** The unit rate of aluminum window shall include the cost of all materials, cost of anodizing, cost of all necessary fixtures and fastenings, labour charges for fixing frames, windows and fixing the window in wall at the place shown in drawing and as instructed by Engineer in charge, all tools and plant required for assembling and fixing in position, finishing as per direction of the Engineer-in-charge, and all other incidental expenses for preparing window frame and shutter of specified size to complete the window structure or its components as shown on the drawings and according to these specifications. They shall also include the cost of making, fixing and making walls good by plaster patch colour etc as required

**3.2.** The window shall be measured for its improvising and fixing extruded Alluminium window two track sliding shutter with frame section **65.0 x 25.0 X 1.25** mm weighing 0.547 Kg./Rmt., bottom, top and vertical channel section **50 X 25 x 1.5** mm weighing 0.457 Kg./Rmt. extrude alluminium colour anodised section frame with sliding shutter with 5 mm thick transparent bronze colour tinted float glass panel of modi guard or equivalent make with powder coated alluminium fittings and fixtures and transparent silicon glass fixings to from as detail including PVC T in frame silicon based linings handles, locks two nos. PVC gasket screws alluminium joints special runner etc. complete. For **Window** and height, limiting dimensions to those specified on plan or as directed.

**3.3.** The rate shall be for a unit of one square meter.

Item No. 23 Providing and Fixing Machine cut, free edges, pre mirror polished Granite stone slab 18mm thick (single piece not more than 150 cm) for Doors/Windows Cill and Jambs cladding as per design including full molded round front edge and 1 cm

nosing and laid on 20 mm thick cement mortar 1:6 (1 cement 6 coarse sand) jointed with grey cement slurry including rubbing and polishing finishing etc complete.

Item No. 24 Providing and fixing standard extruded of alluminium section of size 63 mm x 38.10 mm x 1.20 mm (jindal section 2434 @ Wt. 0.643 Kg/mt) with colour anodized alluminium frame for ventilation with 5 mm thick frosted glass as details etc. complete. For Ventilation.

## **.0 MATERIAL**

### **1.1 Aluminum standard section**

#### **1.1.1 Main outer frame of rectangular tube**

Aluminum alloy used in the manufacture of extruded Ventilation section shall confirm to I S designation HEA-WP of I S 733-1975 and also Designation WVG –WP of I S 1285-1975 section shall be as specified in the drawing and design

Size of the **rectangular tube** shall confirm **65.0 X 25.0 X 1.25 mm**

All sections shall be Free from any scratches or holes or any damages on surface. All section shall have finished luster surface on all sides

#### **1.1.2. frame for ventilation portion**

Aluminum alloy used in the manufacture of extruded Ventilation section shall confirm to I S designation HEA-WP of I S 733-1975 and also Designation WVG –WP of I S 1285-1975 section shall be as specified in the drawing and design

Size of the **frame** shall confirm **65.0 X 25.0 X 1.25 mm**

All channels shall be Free from any scratches or holes or any damages on surface. All section shall have finished luster surface on all sides

#### **1.1.4 PVC rubber top and bottom**

Top and bottom channel of rubber shall be of approved make and quality and shall be Free from any scratches or holes or any damages on surface.

All channels shall have finished luster surface on all sides

### **1.3 Glass**

The glass shall be of approved make having thickness of 5 mm The glass shall be clear and free from scratches and cracks The glass shall be provided on the top

### **1.5. Rubber Gasket**

Rubber gasket shall be of approved make. shall be Free from any scratches or holes or any damages on surface. and shall have finished luster surface on all sides

## **1.6. Fixtures**

### **1.6.2 Louvers assembly**

Louvers assembly shall be of approved make. shall be Free from any scratches or holes or any damages on surface. and shall have finished luster surface on all sides

### **1.1.4 Bolts,**

All bolts shall be of approved make. shall be Free from any scratches or holes or any damages on surface. and shall have finished luster surface on all sides

## **2.0 WORKMANSHIP**

The Work of aluminum ventilation shall be done with extreme finishing. The glass shall be fitted on louvers assembly as directed by Engineer in charge using glazing clips and rubber gaskets as required All the fixtures and fastenings shall be fitted at right place and as directed by Engineer in charge. Floor spring shall be fitted properly so as to align the ventilation properly and shall be given trial of opening and closing properly.

## **3.0 Mode of Measurement & Payment :**

**3.1.** The unit rate of aluminum ventilation shall include the cost of all materials, cost of anodizing, cost of all necessary fixtures and fastenings, labour charges for fixing frames, ventilations and fixing the ventilation in wall at the place shown in drawing and as instructed by Engineer in charge, all tools and plant required for assembling and fixing in position, finishing as per direction of the Engineer-in-charge, and all other incidental expenses for preparing ventilation frame and louvers of specified size to complete the ventilation structure or its components as shown on the drawings and according to these specifications. They shall also include the cost of making, fixing and making walls good by plaster patch colour etc as required

**3.2.** The ventilation shall be measured for its improvising and fixing aluminum Ventilators having standard extruded aluminium outer frame size hollow sections frame of size 65mm x25.0mm x 1.25 mm having wt per Rmt = 0.497 Kg per mtr including providing 5 mm thick sheet glass adjustable louvers with rubber gasket including all labour and equipments etc. complete with ventilator above. For **V3/A** and height, limiting dimensions to those specified on plan or as directed.

**3.3.** The rate shall be for a unit of one square meter.

Item No. 25 Applying two coats of Birla or Asian acrylic lapy (putty) & two coats of primer of approved brand and manufacture on new wall surface to give an even shade including thoroughly brushing the surface free from mortar dropping and otheer foreeign matter and sand papered smooth.

**1.0. Materials :** Water shall be conform to M-I. The plastic emulsion shall conform to I.S. 5411-1969 (part-I).

**2.0. Workmanship:**

2.1. Scaffolding : The relevant specifications of item No. 18.11 para 2.1. shall be followed.

2.2. Preparation of surface : The relevant specifications of item No. 18.44 para 2.2. shall be followed.

2.3. Preparation of Mix : This shall be done as per manufacturers instructions. The thinning of emulsion is to be done with water and not with turpentine. The quantity of thinner to be added shall be as per manufacturer instructions.

**2.4. Applications:**

2.4.1. Before pouring into small containers for use, the paint shall be stirred thoroughly in its container. When applying also, the paint shall be continuously stirred in the smaller container, so that its consistency is kept uniform.

2.4.2. The paint shall be laid on evenly and smoothly by meant of crossing and laying off the crossing and laying off consist of covering the area over with paint, brushing the surface hard for the first lime over and then brushing alternately in opposite direction two or three times and then finally brushing lightly in a direction at right angles to the same. In this process, no brush marks shall be left after the laying off is finished. No hair marks from the brush or clogging of paint puddles in the corners of panels, angles of mouldings, etc. shall be left on the work. The full process of crossing and laying off will constitute one coat.

2.4.3. The paint shall be applied with brush or rollers. For undecorated surfaces, the surface shall be treated with minimum two coats of cement water proofing paint. The second or subsequent coat shall not be started until the preceeding coat has become sufficiently hard to resist marking by brush being used.

2.4.4. The surface on finishing shall present a flat velvety smooth finish. It shall be even and uniform in shade without patches, brush marks, paint drops etc.

**2.5. Precautions:**

(a) Old brushes if they are to be used with emulsion paints, shall be completely dried of turpentine oil paint by washing in warm soap wafer.

Brushes shall be quickly washed in water immediately after use and kept immersed in water during break periods to prevent the paint from hardening on the brush.

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(b) In the preparation of wall for plastic emulsion painting, no oil base putties shall be used in filling cracks, holes etc.

(c) Splashes on floors etc. shall bi cleaned out without delay as they will be difficult to remove after hardening.

(d) Washing of surfaces treated with emulsion paint shall not be done within 3 to 4 weeks of application.

**2.6. Protective measures:** 2.6.1. The relevant specifications of item No. 18.17. para 2.3. shall be followed:

### **3.0. Mode of measurements & payment:**

**3.1.** The relevant specifications of item No. 18.11 shall be followed.

**3.2.** The rate shall be for a unit of one sq. metre.

Item No. 26 Wall painting (Three coats) with plastic emulsion paint of approved brand and manufacture on undercoated wall surfaces to give an even shade incl. thoroughly brushing the surface free from mortar droppings and other foreign matter and sand papered smooth.

#### **1.0. Materials**

Water shall be conform M-1. The plastic emulsion shall conform to I.S.: 5411-1969 (part-I).

#### **2.0. Workmanship**

**2.1. Scaffolding :** The relevant specifications of item-No. 18.11 Para 2.1 From Building Specification Book shall be followed.

**2.2. Preparation of surface :** The relevant specification of item No. 18.44 Para 2.2 From Building Specification Book shall be followed.

#### **2.3. Preparation of Mix :**

This shall be done as per manufacture's instructions. The thinning of emulsion is to be done with water and not with turpentine. The quantity of thinner to be added shall be as per manufacturer instructions.

#### **2.4. Application :**

**2.4.1.** Before pouring into small containers for use, the paint shall be stirred thoroughly in item container. When applying also, the paint shall be continuously stirred in the smaller container, so that its consistency is kept uniform.

**2.4.2.** The paint shall be laid on evenly and smoothly by means of crossing and laying off the crossing and consist of covering the area over with paint, brushing the surface hard for the first time over and then, brushing alternately in opposite direction two or three times and then finally brushing lightly in direction at right angles to the same. In this process, no brush marks shall be left after the laying off is finished. No hair marks from the brush or clogging of paint puddles in the corners of panels, angles of moldings, etc. shall be left on the work. The full process of crossing and laying off will constitute one coat.

**2.4.3.** The paint shall be applied with brush or rollers. For undecorated surfaces, the surface shall be treated with minimum two coats of cement water proofing paint. The second or subsequent coat shall not be started until the proceeding coat as become sufficiently hard to resist marking by brushing being used.

**2.4.4.** The surface on finishing shall present a flat velvety smooth finish. It shall be even and uniform in shade without patches, brush marks, paint drops etc.

#### **2.5. Precautions :**

(a) Old brushes if they are to be used with emulsion paints, shall be completely dried of turpentine or oil paint by washing in warm soap water. Brushes shall be quickly washed in water immediately after use and kept immersed in water during break periods to prevent the paint from hardening on the brush.

(b) In the preparation of wall for plastic emulsion painting, no oil base putty shall be used in filling cracks, holes etc.

(c) Splashes on floors etc. shall be cleaned out without delay as they will be difficult to remove after hardening.

(d) Washing or surfaces treated with emulsion paint shall not be done within 3 to 4 weeks of application

**2.6. Protective payment :** The relevant specifications of item No. 18.11 From Building Specification Book shall be followed.

### **3.0. Mode of measurements and payment**

**3.1.** The relevant specifications of item No. 18.11 From Building Specification Book shall be followed.

**3.2.** The rate shall be for a unit of One sq. meter.

Item No. 27 Finishing wall with weather proof exterior emulsion paint on wall surface (Two coats) to give an required shape even shade after thoroughly brushing the surface to remove all dirt and remains of loose powdered materials etc. complete.

**1.0. Materials :** 1.1. The weather proof exterior emulsion paint shall be of approved brand like Asian or Neriolec or other equivalent make of ISI.

**2.0. Workmanship :**

**2.1. Preparation of surface:**

2.2.1. The surface shall be thoroughly cleaned of all dust, dirt, mortar croppings and other foreign matter before white wash is to be applied.

2.2.2. The surface spoiled by smoke soot shall be scraped with steel wire brushes or steel scrapers or shall be rubbed with over-burnt surkhi or brick bats. The surface shall be then broomed to remove all dust, dirt and shall be washed with clean water.

2.1.3. Oil or grease spots shall be removed by suitable chemical and smooth surface shall be rubbed with wire brushes.

2.2.4. All unsound portion of the surface plaster shall be removed to full depth of plaster in rectangular patches and plastered again after raking the masonry joints properly. Such portion shall be wetted and allowed to dry. They shall then be given one coat of white wash.

2.2.5. All unnecessary nails shall be removed, the holes cracks patches etc. shall be made good with materials similar in imposition to the surface to be prepared.

**2.4. Application of Paint:**

2.4.1. No painting shall be done when the paint is likely to be exposed to a temperature of below 7°C within 48 hours after application.

2.4.2. When weather conditions are such as to cause damage the work shall be carried out in the shadow as far as possible. This helps the proper hardening of the paint film by keeping the surface moist for a longer period.

2.4.3. To maintain the uniform mixture and to prevent segregation, the paint shall be stirred frequently in the bucket.

2.4.4. For undercoated surfaces, the surfaces shall be treated with minimum two coats of Exterior Emulsion paint. Not less than 24 hours shall be allowed between two coats. Next coat shall not be started until the proceeding coat has become

sufficiently hard to resist marking by the brush being used. In hot dry weather, the proceeding coat shall be allowed between

two coats. Next coat shall not be started until the proceeding coat has become sufficiently hard to resist marking by the brush

being used. In hot dry weather, the proceeding coat shall be slightly moistened before applying the subsequent coat.

2.4.5. The finished surface shall be even and uniform in shade, without patches, brush marks, paint drops etc.

2.4.6 The Exterior Emulsion paint shall be applied with a brush with relatively short stiff hog or fibre bristles. The paint shall be brushed in uniform thickness and shall be free from excessive heavy brush marks. The lamps shall be well brushed out.

**3.0. Mode of measurements & payment :**

3.1. All the work shall be measured in the decimal system as under :

(a) Dimensions shall be measured to the nearest 0.01 M.

(b) Area in individual items shall be worked out to the nearest 0.01 Sq. M.

All the work shall be measured in sq. mt. Deductions for jambs, soffits, sills etc. for opening not exceeding 0.5 sq. mt. each in

area for ends of joints, posts, beams, girders, steps etc. not exceeding 0.5 sq. mt. each in area and for opening exceeding 0.3

sq. mt. and not exceeding 3.0 sq. mt. each in area deductions and additions shall be made as under :

3.2. No deductions shall be made for ends of joints beams, posts etc. and openings not exceeding 0.5 sq. mt. each. No addition

shall be made for reveals, jambs, soffits, sills etc. of these openings nor for finish arounds ends of joints, beams, posts etc.



- 3.3. Deductions for openings exceeding 0.5 sq. mt. but not exceeding 3 sq. mt. each shall be made as follows and no addition shall be made for reveals, jambs, soffits etc. of these openings:
- (a) When both the faces or walls are provided with finish, deduction shall be made for one face only.
  - (b) When each face of wall is provided with different finish deduction shall be made for that side of frame for door, windows etc. on which width of reveals is less than that of the other side, where width of reveals on both faces of wall are equal, deduction of 50% of area of opening on each face shall be made from total area of finish.
  - (c) When only one face of wall is treated and the other face is not treated, full deduction shall be made if the width of reveal on the treated side is less than that on the untreated side, but if the width of the reveal is equal or more than on the untreated side neither deductions nor additions be made for reveals, jambs, soffits, sills etc.
- 3.4. In case of area of opening exceeding 3 sq. mt. each, deduction shall be made for openings but jambs, soffits, shall be measured.
- 3.5. No deduction shall be made for attachment such as casing, conducts, pipe, electric wiring and the like.
- 3.6. Corrugated surfaces shall be measured flat as fixed and not girth. The quantities so measured shall be increased by the following percentage and the resultant shall be included with the general areas.
- (a) Corrugated steel sheets 14%
  - (b) Corrugated A. C. Sheets 20%
  - (c) semi corrugated A. C. Sheets 10%
  - (d) Nainital pattern roof (Plain sheeting with rolls) 10%
  - (e) Nainital pattern roof (with corrugated sheets) 25%
- 3.7. Cornices and other wall features, when they are not picked out in a different finish/colour shall be girthed and included in the general area
- 3.8. The rate shall include the cost of all materials, labour, scaffolding, protective measures etc. involved in all the operations described above.
- 3.9. The rate shall be for a unit of one sq. metre.

Item No. 28 Provdg. & fixing water closet squatting pna (Indian type W.C. Pan) size 580 mm (Earthwork, bed concrete, foot rests and trap to be measured and paid for separately). (A) Vitreous China :(I) In white colour

### **General**

This work shall consist of **Providing and fixing wash down water closet (Indian, W.C. Pan Size 580 mm with 100 mm I 'P' or 'S' trap including jointing the trap with soil pipe** of the shape and dimensions shown on the drawings and conforming to these Specifications or as approved by the Engineer in charge

### **MATERIAL**

#### **1.0. wash down water closet (Indian type)**

**1.1.** The Indian type white glazed water closet of first quality shall be of size as specified in the item and conforming to I.S. 771-1979 and I.S. 2556 – (Part-II) 1981. Each pan shall have integral flushing. It shall also have an inlet at back or front for connecting flush pipes as directed. The inside of the bottom of the pan shall have sufficient

slope from the front towards the outlet and surface shall be uniform and smooth. Pan shall be provided with 100 mm. diameter 'P' or 's' trap with approximately 50 mm. Water seal and 50 mm . diameter vent horn.

## **2.0. Foot Rests**

**2..1.** A pair of whit glazed earthen ware rectangular foot to minimum size 250 mm 130 mm. x 20 mm shall be provided with the water closet.

## **3.0. 'P' or 'S' trap for water closet squatting pan Vitreous China.**

**3.1.** 'P' or 'S' trap shall be of white porcelain first quality best Indian make and it shall conform to general Indian IS standards The size of the 'P' or 'S' trap shall be as specified in item. 'P' or 'S' trap shall be of one piece All internal angles shall be designed so as to facilitate cleaning.

**3.2.** 'P' or 'S' trap shall have single piece as specified.

## **3. 0. WATER**

**3.1** Water shall not be salty brackish and shall be clean reasonably clear and free objectionable quantities of silt and traces of oil injurious alkalis salts organic matter and other deleterious material which will either weaken the mortar of concrete or cause efflorescence or attack the steel in R C C container for transport storage and huddling of water shall be clean, Water shall confirm to the standard specified in I S 455 -1978

**3.2.** If required by the Engineer in charge it shall be tested by comparison with distilled water compression shall be made by means of standard cement tests for soundness time of setting and mortar strength as specified in I S 269-1976 Any indication of unsoundness charge in time of setting by 30 minutes or more or decrease of more than 10 percent strength of mortar prepared with distilled water sample when compared with the result obtained with mortar prepared with distilled water shall be sufficient cause for rejection of water under test.

**3.3** Water for curing mortar concrete or masonry should not be too acidic or too alkaline

**3.4** It shall be free of elements which significantly affect the hydration reaction or otherwise interface with the hardening of mortar or concrete during curing or those which produce objectionable stains or other unsightly deposits on concrete or mortar surfaces

**3.5** Hard and bitter water and sea water shall not be permitted for curing

**3.6** Potable water will generally found suitable for curing mortar or concrete

**3.7.** Storage Water shall be stored in containers/ tanks covered at top and cleaned at regular intervals in order to prevent intrusion by foreign matter or growth of organic matter Water from shallow muddy or marshy surface shall not be permitted The intake pipe shall be enclosed to exclude silt, mud grass and other solid materials and there shall be a minimum depth of 0.60 m on water below the intake at all times

**3.8.** As a guide following concentrations represent the maximum permissible values

(a) to neutralize 200 ml sample of water using phenolphthalein as indicator, it should not require more than 2 ml of 0.1 normal NaOH

(b) To neutralize 200 ml of water using methyl orange as an indicator, it should not required more than 10 ml of 0.1 normal HCl

(c) the permissible limits for solids shall be as follows when tested in accordance with IS 3025

	Permissible limits (Max)
Organic	200 mg/lit
Inorganic	3000 mg/lit
Soleplates (SO <sub>4</sub> )	500 mg/lit
Chlorides (Cl)	500 mg/lit
Suspended matter	2000 mg/lit

In case of structures of length 30 m and below, the permissible limit of chlorides may be increased up to 1000 mg/lit

All samples of water (including potable water shall be tested and suitable measures taken where necessary to ensure conformity of the water to the requirements stated herein.

(d) The pH value shall not be less than 6

#### **4.0 CEMENT**

**4.1.** Cement to be used in the works shall be any of the following types with the prior approval of the Engineer:

- a)** Ordinary Portland cement, 33 Grade, conforming. to *IS:269*.
- b)** Rapid Hardening Portland cement, conforming to *IS:8041*.
- c)** Ordinary Portland Cement, 43 Grade, conforming to *IS: 8112*.
- d)** Ordinary Portland Cement, 53 Grade, conforming to *IS: 12269*.
- e)** Soleplate Resistant Portland cement, conforming to *IS: 12330*.

**4.2.** Cement conforming to IS:269 shall be used only after ensuring that the minimum required design strength can be achieved without exceeding the maximum permissible cement content of 540 kg/cum. of concrete.

**4.3.** Cement conforming to IS: 8112 and IS: 12269 may be used provided the minimum cement content mentioned elsewhere from durability considerations is not reduced. From strength considerations, these cements shall be used with a certain caution as high early strengths of cement in the 1 to 28-day range can be achieved by finer grinding and higher constituent ratio of C<sub>3</sub>S/C<sub>2</sub>S, where C<sub>3</sub>S is Tri-calcium Silicate and C<sub>2</sub>S is D-calcium Silicate. In such cements, the further growth of strength beyond say 4 weeks may be much lower than that traditionally expected. Therefore, further strength tests shall be carried out for 56 and 90 days to fine tune the mix design from strength considerations.

**4.4.** Cement conforming to IS: 12330 shall be used when sodium soleplate and magnesium soleplate are present in large enough concentration to be aggressive to concrete. The recommended threshold values as per IS:456 are soleplate concentration in excess of 0.2 per cent in soil substrata or 300 ppm (0.03 percent) in ground water. Tests to confirm actual

values of soleplate concentration are essential when the structure is located near the sea coast, chemical factories, agricultural land using chemical fertilizers and sites where there are effluent discharges or where soluble soleplate bearing ground water level is high Cement conforming to IS:12330 shall be carefully selected from strength considerations to ensure that the minimum required design strength can be achieved without exceeding the maximum permissible cement content of 540 kg/cum. of concrete.

**4.5.** Cement conforming to IS 8041 shall be used only for pre cast concrete products after specific approval of the Engineer in charge

**4.6.** Total chloride content in cement shall in no case exceed 0.05 percent by mass of cement also total sulfur content calculated as sulfuric anhydride ( $\text{SO}_3$ ) shall in no case exceed 2.5 per cent and 3.0 percent when tri-calcium aluminates per cent by mass in up to 5 or greater than 5 respectively

#### **4.7. Storage**

Cement shall be transported, handled and stored on the site in such a manner as to avoid deterioration or contamination, Cement shall be stored above ground level in perfectly dry and water tight sheds and shall be stacked not more than eight bags high. Wherever bulk storage containers are used their capacity should be sufficient to cover the requirement at site and should be cleaned at least once every 3 to 4 months

**4.8.** Each consignment shall be stored separately so that it may be readily identified and inspected and cement shall be used in the sequence in which it is delivered in any way, during storage shall not be used in the works and shall be removed from the site by the contractor without charge to the employer

The contractor shall prepare and maintain proper records on site in respect of delivery handling storage and use of cement and these records shall be available for inspection by the engineer in charge at all times

**4.9.** The contractor shall make a monthly return to the engineer in charge on the date corresponding to the interim certificate date showing the quantities of cement received and issued during the month in stock at the end of the month.

#### **5.0 SAND**

**5.1** Sand shall be natural sand, clean well graded, hard strong durable and gritty particular free from immure amounts of dust, clay, kankar modules

**5.2.** For masonry works sand shall conform to the requirements of IS: 2116

**5.3.** For plain and reinforced cement concrete (PCC and RCC) or pre stressed concrete (PSC) works fine aggregates shall consist of clean, hard strong and durable pieces of crushed stone, crushed gravel or suitable combination of natural sand crushed stone or gravel, They shall not contain dust lumps soft or flaky materials mica or other deleterious materials in such quantities as to reduce the strength and durability of concrete, or to attack the embedded steel. Motorized sand washing machines should be used to remove impurities from sand. Fine aggregate having positive alkali-silica reaction shall not be used. All fine aggregates shall conform to IS L 383 and tests for conformity shall be carried out as per IS : 2386 (Part I to VIII) The contractor shall submit to the Engineer in charge the entire information indicated in Appendix A of IS : 383. The fineness modulus of fine aggregate shall neither be less than 2.00 nor greater than 3.5.

**5.4.** Sand fine aggregates for structural concrete shall conform to the following grading requirements as shown in the table below

**5.5 Fine Sand:** The fineness module shall not exceed 1.0 the sieve analysis of fine sand be as under:

IS. Sieve Designation % by wt. passing			
	Zone I	Zone II	Zone III
10 mm	100	100	100
4.75 mm	90-100	90-100	90-100
2.3 6mm	60-95	75-100	85-100
1.18 mm	30-70	55-90	75-100
600 MC	15-34	35-59	60-79
300 MC	5-20	8-30	12-40
150 MC	0-10	0-10	0-10

**5.6. Coarse Sand:** The fineness modules of coarse sand shall not be less than 2.5 and shall not exceed 3.0. The sieve analysis of coarse sand be as under:

I. S. Sieve Designation	% by wt. passing
4.75 mm	100
2.36mm	90 to 100
1.18 mm	70 to 100
600 MC	30 to 100
300 MC	85 to 70
150 MC	00 to 50

## 5.2. Proportion of Mix

**5.2.1. Cement and sand shall be mixed to specified proportion, sand being measured by measuring boxes, the proportion of cement will be by volume on the basis of 50 Kg/Bag of cement being equal to 0.0342 Cu.m. The mortar may be hand mixed or machine mixed as directed.**

## 5.3. Proportion of Mortar :

**5.3.1. In hand mixed mortar, cement and 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 colour is obtained. Mixing platform shall be so arranged that no deleterious extraneous material shall get mixed with mortar or mortar shall flow out. While mixing, the water shall be gradually added and thoroughly mixed to form a stiff plastic mass of uniform colour so that each particle of sand shall be completely covered with a film of wet cement. The water cement ratio shall be adopted as directed**

**5.3.2. The mortar so prepared shall be used within 30 minutes of adding water. Only such quantity of mortar shall be prepared as can be used within 30 minutes**

## 6.0. WORKMANSHIP

**6.1. The (Indian type) pan shall be sunk into the floor and embedded in a cushion of average 15cm. cement concrete 1:5:10 ( 1 cement : 10 graded stone aggregate or brick aggregate 40**

mm. nominal size) or and its bed concrete. The floor should be left 115 mm below the top level of the pan so as to allow for flooring and its bed concrete. The floor should be suitably stopped so that the waste water is drained into the pan. The shall be provided with 100 mm. 'P' or 'S' trap as specified in the **item No. 23.113** with approximately 50 mm. seal. The joints between the pan and the trap shall be made leak- proof with cement mortar 1:1 ( 1 cement : 1 fine sand).

**6.2.** The 'P' or 'S' trap shall be fixed with pan cast iron pipe with C.M. 1.1. The pan shall be provided with a 100 nun. 'P' or 'S' trap as specified in the item with an approximately 50 mm . seal The joint between the pan and the trap shall be made leak-proof with cement mortar 1:1(1 cement : 1 fine sand).

## **6.0 MODE OF MEASUREMENT & PAYMENT :**

**6.1.** The unit rate Water Closet shall include the cost of all materials, tools and plant required for lifting to required height with all lead and lift, placing & fixing in position, all required specials and jointing adhesive compound, finishing as per direction of the Engineer-in-charge, and all other incidental expenses for producing Water Closet work of specified size to complete the structure or its components as shown on the drawings and according to these specifications.

**6.2.** The rate includes cost of labour for fixing pans and seat cover, inlet outlet connections , including the cost of seat and covers and water jet including testing the same

**6.3.** The Water Closet work shall be measured for its number limiting to specified capacity to those specified on plan or as directed. The rate shall be for a unit of one number.

**6.4** The payment will be made on number basis of the finished work.

Item No. 29 Provdg. & fixing 100 mm size P or S trap for water closet squatting pan incl. Jointing the trap with the pan & soil pipe in cement mortar 1:1 ( 1 cement : 1 fine sand) (A) Vitreous China.

### **General**

This work shall consist of **Providing and fixing wash down water closet (Indian, W.C. Pan Size 580 mm with 100 mm I 'P' or 'S' trap including jointing the trap with soil pipe** of the shape and dimensions shown on the drawings and conforming to these Specifications or as approved by the Engineer in charge

## **MATERIAL**

### **1.0. wash down water closet (Indian type)**

**1.1.** The Indian type white glazed water closet of first quality shall be of size as specified in the item and conforming to I.S. 771-1979 and I.S. 2556 – (Part-II) 1981. Each pan shall have integral flushing. It shall also have an inlet at black an or front for connecting flush pipes as directed. The inside of the bottom of the pan shall have sufficient slope from the front towards the outlet and surface shall be uniform and smooth. Pan shall

be provided with 100 mm. diameter 'P' or 's' trap with approximately 50 mm. Water seal and 50 mm . diameter vent horn.

## **2.0. Foot Rests**

**2..1.** A pair of whit glazed earthen ware rectangular foot to minimum size 250 mm 130 mm. x 20 mm shall be provided with the water closet.

## **3.0. 'P' or 'S' trap for water closet squatting pan Vitreous China.**

**3.1.** 'P' or 'S' trap shall be of white porcelain first quality best Indian make and it shall conform to general Indian IS standards The size of the 'P' or 'S' trap shall be as specified in item. 'P' or 'S' trap shall be of one piece All internal angles shall be designed so as to facilitate cleaning.

**3.2.** 'P' or 'S' trap shall have single piece as specified.

## **3. 0. WATER**

**3.1** Water shall not be salty brackish and shall be clean reasonably clear and free objectionable quantities of silt and traces of oil injurious alkalis salts organic matter and other deleterious material which will either weaken the mortar of concrete or cause efflorescence or attack the steel in R C C container for transport storage and huddling of water shall be clean, Water shall confirm to the standard specified in I S 455 -1978

**3.2.** If required by the Engineer in charge it shall be tested by comparison with distilled water compression shall be made by means of standard cement tests for soundness time of setting and mortar strength as specified in I S 269-1976 Any indication of unsoundness charge in time of setting by 30 minutes or more or decrease of more than 10 percent strength of mortar prepared with distilled water sample when compared with the result obtained with mortar prepared with distilled water shall be sufficient cause for rejection of water under test.

**3.3** Water for curing mortar concrete or masonry should not be too acidic or too alkaline

**3.4** It shall be free of elements which significantly affect the hydration reaction or otherwise interface with the hardening of mortar or concrete during curing or those which produce objectionable stains or other unsightly deposits on concrete or mortar surfaces

**3.5** Hard and bitter water and sea water shall not be permitted for curing

**3.6** Potable water will generally found suitable for curing mortar or concrete

**3.7.** Storage Water shall be stored in containers/ tanks covered at top and cleaned at regular intervals in order to prevent intrusion by foreign matter or growth of organic matter Water from shallow muddy or marshy surface shall not be permitted The intake pipe shall be enclosed to exclude silt, mud grass and other solid materials and there shall be a minimum depth of 0.60 m on water below the intake at all times

**3.8.** As a guide following concentrations represent the maximum permissible values

(a) to neutralize 200 ml sample of water using phenolphthalein as indicator, it should not require more than 2 ml of 0.1 normal NaOH

(b) To neutralize 200 ml of water using methyl orange as an indicator, it should not required more than 10 ml of 0.1 normal HCl

(c) the permissible limits for solids shall be as follows when tested in accordance with IS 3025

	Permissible limits (Max)
Organic	200 mg/lit
Inorganic	3000 mg/lit
Soleplates (SO <sub>4</sub> )	500 mg/lit
Chlorides (Cl)	500 mg/lit
Suspended matter	2000 mg/lit

In case of structures of length 30 m and below, the permissible limit of chlorides may be increased up to 1000 mg/lit

All samples of water (including potable water shall be tested and suitable measures taken where necessary to ensure conformity of the water to the requirements stated herein.

(d) The pH value shall not be less than 6

#### 4.0 CEMENT

**4.1.** Cement to be used in the works shall be any of the following types with the prior approval of the Engineer:

- a) Ordinary Portland cement, 33 Grade, conforming. to *IS:269*.
- b) Rapid Hardening Portland cement, conforming to *IS:8041*.
- c) Ordinary Portland Cement, 43 Grade, conforming to *IS: 8112*.
- d) Ordinary Portland Cement, 53 Grade, conforming to *IS: 12269*.
- e) Soleplate Resistant Portland cement, conforming to *IS: 12330*.

**4.2.** Cement conforming to IS:269 shall be used only after ensuring that the minimum required design strength can be achieved without exceeding the maximum permissible cement content of 540 kg/cum. of concrete.

**4.3.** Cement conforming to IS: 8112 and IS: 12269 may be used provided the minimum cement content mentioned elsewhere from durability considerations is not reduced. From strength considerations, these cements shall be used with a certain caution as high early strengths of cement in the 1 to 28-day range can be achieved by finer grinding and higher constituent ratio of C<sub>3</sub>S/C<sub>2</sub>S, where C<sub>3</sub>S is Tri-calcium Silicate and C<sub>2</sub>S is D-calcium Silicate. In such cements, the further growth of strength beyond say 4 weeks may be much lower than that traditionally expected. Therefore, further strength tests shall be carried out for 56 and 90 days to fine tune the mix design from strength considerations.

**4.4.** Cement conforming to IS: 12330 shall be used when sodium soleplate and magnesium soleplate are present in large enough concentration to be aggressive to concrete. The recommended threshold values as per IS:456 are soleplate concentration in excess of 0.2 per cent in soil substrata or 300 ppm (0.03 percent) in ground water. Tests to confirm actual values of soleplate concentration are essential when the structure is located near the sea



coast, chemical factories, agricultural land using chemical fertilizers and sites where there are effluent discharges or where soluble soleplate bearing ground water level is high Cement conforming to IS:12330 shall be carefully selected from strength considerations to ensure that the minimum required design strength can be achieved without exceeding the maximum permissible cement content of 540 kg/cum. of concrete.

**4.5.** Cement conforming to IS 8041 shall be used only for pre cast concrete products after specific approval of the Engineer in charge

**4.6.** Total chloride content in cement shall in no case exceed 0.05 percent by mass of cement also total sulfur content calculated as sulfuric anhydride ( $\text{SO}_3$ ) shall in no case exceed 2.5 per cent and 3.0 percent when tri-calcium aluminates per cent by mass in up to 5 or greater than 5 respectively

#### **4.7. Storage**

Cement shall be transported, handled and stored on the site in such a manner as to avoid deterioration or contamination, Cement shall be stored above ground level in perfectly dry and water tight sheds and shall be stacked not more than eight bags high. Wherever bulk storage containers are used their capacity should be sufficient to cover the requirement at site and should be cleaned at least once every 3 to 4 months

**4.8.** Each consignment shall be stored separately so that it may be readily identified and inspected and cement shall be used in the sequence in which it is delivered in any way, during storage shall not be used in the works and shall be removed from the site by the contractor without charge to the employer

The contractor shall prepare and maintain proper records on site in respect of delivery handling storage and use of cement and these records shall be available for inspection by the engineer in charge at all times

**4.9.** The contractor shall make a monthly return to the engineer in charge on the date corresponding to the interim certificate date showing the quantities of cement received and issued during the month in stock at the end of the month.

#### **5.0 SAND**

**5.1** Sand shall be natural sand, clean well graded, hard strong durable and gritty particular free from immure amounts of dust, clay, kankar modules

**5.2.** For masonry works sand shall conform to the requirements of IS: 2116

**5.3.** For plain and reinforced cement concrete (PCC and RCC) or pre stressed concrete (PSC) works fine aggregates shall consist of clean, hard strong and durable pieces of crushed stone, crushed gravel or suitable combination of natural sand crushed stone or gravel, They shall not contain dust lumps soft or flaky materials mica or other deleterious materials in such quantities as to reduce the strength and durability of concrete, or to attack the embedded steel. Motorized sand washing machines should be used to remove impurities from sand. Fine aggregate having positive alkali-silica reaction shall not be used. All fine aggregates shall conform to IS L 383 and tests for conformity shall be carried out as per IS : 2386 (Part I to VIII) The contractor shall submit to the Engineer in charge the entire information indicated in Appendix A of IS : 383. The fineness modulus of fine aggregate shall neither be less than 2.00 nor greater than 3.5.

**5.4.** Sand fine aggregates for structural concrete shall conform to the following grading requirements as shown in the table below

**5.5 Fine Sand:** The fineness module shall not exceed 1.0 the sieve analysis of fine sand be as under:

IS. Sieve Designation % by wt. passing			
	Zone I	Zone II	Zone III
10 mm	100	100	100
4.75 mm	90-100	90-100	90-100
2.3 6mm	60-95	75-100	85-100
1.18 mm	30-70	55-90	75-100
600 MC	15-34	35-59	60-79
300 MC	5-20	8-30	12-40
150 MC	0-10	0-10	0-10

**5.6. Coarse Sand:** The fineness modules of coarse sand shall not be less than 2.5 and shall not exceed 3.0. The sieve analysis of coarse sand be as under:

I. S. Sieve Designation	% by wt. passing
4.75 mm	100
2.36mm	90 to 100
1.18 mm	70 to 100
600 MC	30 to 100
300 MC	85 to 70
150 MC	00 to 50

## 5.2. Proportion of Mix

**5.2.1. Cement and sand shall be mixed to specified proportion, sand being measured by measuring boxes, the proportion of cement will be by volume on the basis of 50 Kg/Bag of cement being equal to 0.0342 Cu.m. The mortar may be hand mixed or machine mixed as directed.**

## 5.3. Proportion of Mortar :

**5.3.1. In hand mixed mortar, cement and 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 colour is obtained. Mixing platform shall be so arranged that no deleterious extraneous material shall get mixed with mortar or mortar shall flow out. While mixing, the water shall be gradually added and thoroughly mixed to form a stiff plastic mass of uniform colour so that each particle of sand shall be completely covered with a film of wet cement. The water cement ratio shall be adopted as directed**

**5.3.2. The mortar so prepared shall be used within 30 minutes of adding water. Only such quantity of mortar shall be prepared as can be used within 30 minutes**

## 6.0. WORKMANSHIP

**6.1. The (Indian type) pan shall be sunk into the floor and embedded in a cushion of average 15cm. cement concrete 1:5:10 ( 1 cement : 10 graded stone aggregate or brick aggregate 40 mm. nominal size) or and its bed concrete. The floor should be left 15 mm below the top level of the pan so as to allow for flooring and its bed concrete. The floor should be suitably**

stopped so that the waste water is drained into the pan. The shall be provided with 100 mm. 'P' or 'S' trap as specified in the **item No. 23.113** with approximately 50 mm. seal. The joints between the pan and the trap shall be made leak- proof with cement mortar 1:1 ( 1 cement : 1 fine sand).

**6.2.** The 'P' or 'S' trap shall be fixed with pan cast iron pipe with C.M. 1.1. The pan shall be provided with a 100 nun. 'P' or 'S' trap as specified in the item with an approximately 50 mm . seal The joint between the pan and the trap shall be made leak-proof with cement mortar 1:1(1 cement : 1 fine sand).

## **6.0 MODE OF MEASUREMENT & PAYMENT :**

**6.1.** The unit rate Water Closet shall include the cost of all materials, tools and plant required for lifting to required height with all lead and lift, placing & fixing in position, all required specials and jointing adhesive compound, finishing as per direction of the Engineer-in-charge, and all other incidental expenses for producing Water Closet work of specified size to complete the structure or its components as shown on the drawings and according to these specifications.

**6.2.** The rate includes cost of labour for fixing pans and seat cover,inlet outlet connections , including the cost of seat and covers and water jet including testing the same

**6.3.** The Water Closet work shall be measured for its number limiting to specified capacity to those specified on plan or as directed. The rate shall be for a unit of one number.

**6.4** The payment will be made on number basis of the finished work.

Item No :- 30 Procddg. & fixing wash basin with single hole for pillar tap with C.I. or M.S. brackets painted white incl. Cutting holes and making good the same but excluding fittings. (A) Vitreous China : (II) Flat back washbasin 550 mm x 400 mm size (I) In white colour including C.P. Brass west , West pipe, Stop tap

## **1.0 MATERIAL**

### **1.1. WASH BASIN**

Wash basin squatting pan shall be European type and of best quality as approved by engineer in charge size of the wash basin shall match as per provision in the item of wash basin. type and shape and colour of the wash basin shall be approved by Engineer in charge.

1.1.2 Wash basin shall be of white porcelain first quality best Indian make and it shall conform to IS 2556 (Part – IV) – 1972 and I.S 771 – 1979. The size of the wash basin shall be as specified in the item Wash basin shall be of one piece construction with continued over flow arrangements. All internal angles shall be designed so as to facilitate cleaning. Wash basin shall have single tap hole or two holes as specified. Each basin shall have a circular waste hole which is either rebated or beveled internally with 65 mm diameter at top and 10 mm depth to suit the waste fitting. The necessary

stud slot to receive the bracket on the under side of the basin shall be provided Basin shall have an internal soap holder recess which shall fully drain into the bowl.

### **1.2. Chromium plated bottle trap**

P-trap shall be of best quality as approved by engineer in charge

### **1.3. Pillar cock**

Pillar cock shall be of best quality and make and chromium plated as approved by engineer in charge

### **1.4. Stop cock**

Stop cock shall be of 15 mm dia meter and shall be chromium plated of best quality as approved by engineer in charge

### **1.5. C P Brass waste**

C P Brass waste shall be of best quality as approved by engineer in charge having 40 mm dia meter

## **2.0. WORKMANSHIP**

**2.1.** The washbasin shall be fixed on the wall as and where directed. The wash basin shall be supported on a pair of M.S. or C.I. brackets fixed in C.M. 1:3 (1 cement : 3 sand). The bracket shall conform to I.S. 775 – 1962. The wall plaster on the rear shall be cut to rest the top edge of the washbasin. After fixing the basing plaster shall be made good and surface finished to match the existing one.

**2.2.** The brackets shall be painted white with ready – mixed paint.

**2.3.** The C.I. brass trap and union shall be connected to 32 mm dia waste pipe which shall be suitably bent towards the wall and which shall discharge into an open drain leading to a gully trap or direct in to gully-trap on the ground floor and shall be connected to a waste pipe through a floor trap on the upper floors. C.P. brass trap and union may not be provided where the surface drain or a floor trap is placed directly under basin and the waste is discharged in to vertically.

**2.4.** The height of the front edge to the wash basin from the floor level shall be 80 cms.

**2.5.** The necessary inlet, outlet, connections and fittings such as pillar cocks, CP dress waste trap waste pipe, stop cock, chain wish rubber plug etc. shall be fixed.

**2.6.** The payment of fittings shall be made separately under separate items.

## **3.0 MODE OF MEASUREMENT & PAYMENT :**

**3.1.** The unit rate Wash basin shall include the cost of all materials, tools and plant required for lifting to required height with all lead and lift, placing & fixing in position,

all required specials and jointing adhesive compound, finishing as per direction of the Engineer-in-charge, and all other incidental expenses for producing Wash basin work of specified size to complete the structure or its components as shown on the drawings and according to these specifications.

**3.2.** The Wash basin work shall be measured for its number limiting to specified capacity to those specified on plan or as directed. The rate shall be for a unit of one number.

**3.3.** The payment will be made on number basis of the finished work.

Item No. 31 Providing laying and jointing in true line and level UPVC pipe (SCH-40) of following dia. Including fittings of standard make as approved by Engineer in charge pipe shall be fixed on the wall with the help of clamp at every 2000 mm center to center or shall be concealed as directed including necessary fittings etc. including testing of pipe and joints and fixing the same with adhesive solvent, including cost of all materials (A) 15 mm

Item No. 32 Providing laying and jointing in true line and level UPVC pipe (SCH-40) of following dia. Including fittings of standard make as approved by Engineer in charge pipe shall be fixed on the wall with the help of clamp at every 2000 mm center to center or shall be concealed as directed including necessary fittings etc. including testing of pipe and joints and fixing the same with adhesive solvent, including cost of all materials (C) 25 mm

Item No - 33 Providing & fixing screw down bib taps of following size (A) Brass screw down bib tap polished bright (ii) 20 mm dia

## **1.0 MATERIAL**

### **1.0 Towel Rail**

**1.1.** Towel rail shall be of iron and shall be sound and free from porosity or any defects which affect serviceability. The thickness of the base metal shall not be less than 6.5 mm. The surface shall be smooth and free from scale, chips and other flaws or any other kind of defect which affect serviceability. The size of Towel rail shall be specified and shall be of self cleaning design.

**1.2** The Towel rail shall be of quality approved by Engineer in charge and shall generally conform to the relevant Indian standard

**1.3** The Towel rail provided shall be with fitted on brackets fitted on wall of glazed tiled surface of wall by drilling holes duly plugged by wooden gummies by appropriate size of screws as approved by Engineer in charge.

**1.2.** The Necessary galvanized fittings like sockets, screws etc, shall be of best quality and makes as approved by the Engineer-in-charge.

## **2.0. WORKMANSHIP**

### **FITTING & FIXING**

**2.1.** When the Towel rail are to be Fitted, the surface of wall or tiles shall not be damaged. The Towel rail shall be fitted on walls carefully by drilling holes in surface of walls or tiled surface of wall carefully while fitting of sockets

**2.2** In fitting of the Towel rail the socket shall be fitted by means of screws

### **3.0 MODE OF MEASUREMENT & PAYMENT :**

**3.1.** The unit rate of Towel rail shall include the cost of all materials, tools and plant required for fitting, the same to specified position as per drawings, and as directed by Engineer in charge finishing structure, etc, and all other incidental expenses for producing Towel rail work to complete the structure or its components as shown on the drawings, and as directed by Engineer in charge and according to these specifications. They shall also include the cost of making, fixing and removing of all scaffolding and forms required for the work.

The rate of Towel rails shall include the cost of all labour, materials, G I fittings as required, tools and plant scaffolding and all incidental expenses as described herein above.

**3.2.** The Towel rail shall be measured for its **Number**, limiting dimensions to those specified on plan or as directed. The rate shall be for a unit of one Number.

**3.3.** The payment will be made on number basis of the finished work.

Item No- 34 Providing & fixing PVC SWR Nahni trap Is 14735 for drain 100 mm diameter with jali of the following nominal diameter of self cleansing design with CI screed down or hinged grating including the cost of cutting and making good the walls.

### **1.0. Materials**

**1.1.** The **PVC SWR Nahni Trap** shall conform to **IS 14735 for drain**. The C.I. hinged or screwed down cover shall be of best quality & as approved by Engineer in charge.

### **2.0. Workmanship**

**2.1.** The Nahni trap with 100 mm. dia inlet and 50 mm. dia. outlet shall be fixed as per drawing or as directed.

**2.2.** The Nahni trap shall be jointed with drainage Pipe.

### **3.0. Mode of measurements and payment**

**3.1.** The rate includes cost of all labour, materials, tools and plants etc. required for satisfactory completion of this item including lead, jointing and testing.

**3.2.** The rate shall be for a unit of one number.

Item No. 35 Provdg. & fixing S.W. Gully trap with C.I. grating brick masonry chamber & water tight C.I. cover with frame of 300 mm x 300 mm size (inside) with standard weight (A) 100 mm x 100 mm size P-type.

**1.0 Materials :** (1) Water shall conform to M-I. (2) Cement mortar of proportion 1: 5 shall conform to to M-I 1. (3) Burnt

brick shall conform to M-15. (4) The S.W. Gulley trap of 100 mm. x 100 mm. size shall conform to M-70.

**2.0. Workmanship :** 2.1. Excavation for gulley trap shall be done true to dimensions and levels as indicated on plans or as directed.

The excavation work shall generally be done as per relevant specification of item 4.0.0. of earth work.

**2.2. Fixing :** 2.2.1. The gulley trap shall be fixed over cement concrete 1: 5 : 10 (1 cement: 5 sand : 10 graded brick bats

aggregate 40 mm. nominal size) foundation 650 mm. square and 100 mm. thick. The depth of top of concrete below the

ground level shall be 675 mm. The jointing of gulley outlet to the branch drain shall be done similar to jointing of S. W. pipe

as described in item No. 24.1.(A).

**2.3. Brick masonry chamber:** After fixing and testing gulley and branch drain, a brick masonry 300 x 300 mm. inside with

bricks in C.M. 1 : 5 (1 cement: 5 sand) shall be built With a 100 mm. brick work round the gulley trap from the top of bed

concrete upto ground level. The space between the chamber walls and the trap shall be filled with cement concrete 1:5:10.

The upper portion of the chamber i.e. above the top level of the trap shall be plastered inside with cement mortar 1 : 3 (1

cement: 3 sand) finished with floating coat of neat cement. The corners and bottom of the chamber shall be rounded off so as

to slope towards the grating.

2.4. C.I. cover with frame 300 mm. x 300 mm. (inside) size shall than be fixed on the top of the brick masonry with C.C. 1:2:4

(1 cement: 2 coarse sand: 4 graded stone aggregate 20 mm. nominal size) 40 mm. thick and rendered smooth. The finished

top of the cover shall be left about 40 mm. above the adjoining ground level so as to exclude the surface water from entering

the gulley trap.

**3.0. Mode of measurements & payment:**

3.1. The rate includes cost of all labour, materials, tools and plant etc. required for satisfactory completion of this item as described above.

3.2. The rate shall be for a unit of one number basis.

Item no. 36 Provdg. & fixing to wall ceiling and floor 10.0 kg./cm<sup>2</sup> (UPVC) working pressure polythelene pipes of the following outside dia, low density, complete with special flange compression type fittings, wall clips etc. incl. Making good the wall ceiling and floor.(A) 110 mm

**1.0. Materials :** 1.1. The low density polythene pipe of specified diameter with 6 Kg./F. Sq. Cm. working pressure shall conform to I.S. 3076-1968. The specials and fillings required shall be of best quality.

**2.0. Workmanship:**

2.1. The P.V.C. Pipes of specified diameter shall be fixed as directed. Due to thermal expansion of rigid P.V.C. Pipes, due

allowance shall be made particularly in over ground pipe lines for any change in length of pipe line which may occur during installation or when pipe line is in service.

2.2. Above ground installation of rigid P.V.C. pipe should be undertaken after precautions are observed for their protection against dirt sun rays and mechanical damage.

2.3. The rigid P.V.C. pipe lines should not be kept exposed above ground when it passes through public place, railway lines, roads, road side and footpaths.

2.4. P.V.C. pipes shall be supported at the followings intervals :

20 mm. dia. 500 mm.

25 mm. dia. 750 mm.

32mm. dia. 900mm.

2.5. Closet support spacings shall be provided, if recommended by the manufacturer.

2.6. The guide line indicated by the manufacturer regarding handling, transportation, storing, laying and jointing of pipes shall be kept in view during execution.

2.7. P.V.CV. pipes shall be fixed on wall with wooden plugs and suitable clamps.

### **2.8. Jointing the pipes :**

2.8.1. The pipes and sockets shall be accurately cut. The ends of the pipes and filling should be absolutely free from dirt and

dust The outside surface of the pipes and the inside of the fillings shall then be roughened with emery paper, and then solvent cement shall be applied to the matching surface and pushed home and joint. Since solvent cement is aggressive to P.V.C.

care must be taken to avoid applying excessive cement to the inside of pipe sockets as any surplus cement cannot be wiped

off after jointing. Empty solvent cement tins, brushes, rags, of paper unpregnated with cement should not be buried in the trenches. They should be gathered, not left scattered about, as they can prove to be a hazard to animals which may chew them.

2.8.2. If any manufacturer recommends its own methods of jointing the same shall be adopted after necessary approval from the Engineer-in-charge.

### **2.9. Laying pipes in trenches :**

2.9.1. The pipes shall be laid over uniform relatively soft fine grained soil found to be free of presence of hard objects such

as large flints, rocky projections, large tree roots etc. The width of the trenches shall be minimum width required for working.

2.9.2. The pipes laid underground shall not be less than one metre from the ground level.

The pipe shall be positioned in the trenches so as to avoid any induced stresses due to reflection. Any deviation required shall be obtained by using proper type of rubber ring joints.

### **3.0. Mode of measurements & payment:**

3.1. The relevant specifications of item No. 23.2 (A) shall be followed except that the P.V.C. pipes of specified dia. shall be paid under this item.

3.2. The rate shall be for a unit of one running metre.



Item no. 37 Provdg. & fixing to wall ceiling and floor 6.0 kg.F/cm<sup>2</sup> (UPVC) working pressure polythelene pipes of the following outside dia, low density, complete with special flange compression type fittings, wall clips etc. incl. Making good the wall ceiling and floor.(A) 110 mm

**1.0. Materials :** 1.1. The low density polythene pipe of specified diameter with 6 Kg./F. Sq. Cm. working pressure shall conform to I.S. 3076-1968. The specials and fillings required shall be of best quality.

**2.0. Workmanship:**

2.1. The P.V.C. Pipes of specified diameter shall be fixed as directed. Due to thermal expansion of rigid P.V.C. Pipes, due allowance shall be made particularly in over ground pipe lines for any change in length of pipe line which may occur during installation or when pipe line is in service.

2.2. Above ground installation of rigid P.V.C. pipe should be undertaken after precautions are observed for their protection against dirt sun rays and mechanical damage.

2.3. The rigid P.V.C. pipe lines should not be kept exposed above ground when it passes through public place, railway lines, roads, road side and footpaths.

2.4. P.V.C. pipes shall be supported at the followings intervals :

20 mm. dia. 500 mm.

25 mm. dia. 750 mm.

32mm. dia. 900mm.

2.5. Closet support spacings shall be provided, if recommended by the manufacturer.

2.6. The guide line indicated by the manufacturer regarding handling, transportation, storing, laying and jointing of pipes shall be kept in view during execution.

2.7. P.V.CV. pipes shall be fixed on wall with wooden plugs and suitable clamps.

**2.8. Jointing the pipes :**

2.8.1. The pipes and sockets shall be accurately cut. The ends of the pipes and filling should be absolutely free from dirt and

dust The outside surface of the pipes and the inside of the fillings shall then be roughened with emery paper, and then solvent

cement shall be applied to the matching surface and pushed home and joint. Since solvent cement is aggreswive to P.V.C.

care must be taken to avoid applying excessive cement to the inside of pipe sockets as any surplus cement cannot be wiped

off after jointing. Empty solvent cement tins, brushes, rags, of paper unpregneted with cement should not be buried in the

trenches. They should be gathered, not left scactrred about, as they can prove to be a hazard to animals which may chew them.

2.8.2. If any manufacturer recommends its own methods of jointing the same shall be adopted after necessary approval from the Engineer-in-charge.

**2.9. Laying pipes in trenches :**

2.9.1. The pipes shall be laid over uniform relatively soft fine grained soil found to be free of presence of hard objects such

as large flints, rocky projections, large tree roots etc. The width of the trenches shall be minimum width required for working.

2.9.2. The pipes laid underground shall not be less than one metre from the ground level. The pipe shall be positioned in the trenches so as to avoid any induced stresses due to reflection. Any deviation required shall be obtained by using proper type of rubber ring joints.

**3.0. Mode of measurements & payment:**

3.1. The relevant specifications of item No. 23.2 (A) shall be followed except that the P.V.C. pipes of specified dia. shall be paid under this item.

3.2. The rate shall be for a unit of one running metre.

Item No. 38 Construction underground sock well 1.50 m diameter & 3 mt in depth with Honey comb Brick masonry having crushing stg. Not less than 35 Kg/ sqmt in C.M. 1:5, 0.35 m thick at bottom 1.50 mt & 0.23 mt thick 1.00 m of honey comb masonry and 0.23 m thick 0.50 m Ht at top level RCC 1:2:4 slab 0.10 m thick of top including inspection gap 0.60 m x 0.45 m and cover Ready made F.R.c. cover whole work as per instruction of Engineer in charge etc. complete

**1.0 Materials :** (1) Water shall conform to M-I, (2) Cement mortar of proportion 1: 1 shall conform to M-11. (3) 100mm.

dia. glazed stoneware pipe shall conform to M-71.

**2.0. Workmanship:** 2.1. The trenches for stoneware pipe drains shall be carried out as per relevant specifications of item No.

23.4(A) except that the work is for stoneware pipes of 100 mm. dia.

**2.2. Laying:** 2.2.1. The pipes shall be laid accurately and perfectly true to line, levels and gradients. Great care shall be taken to prevent sand etc., from entering the pipes. The pipes between two manholes shall be laid truly in a straight line without vertical or horizontal undulation. All junctions and changes in direction and diameter shall be made inside manholes by means of curved tapered channels formed in cement concrete finished smooth and benched on both sides. The body of the pipe shall rest for its entire length, on an even level bed grips being made or left on the bed to receive the sockets of the pipes.

**2.3. Jointing:**

2.3.1. Tarred gaskin or yam soaked in neat cement slurry first be placed around the spigot of each pipe and the spigot shall then be placed well home into the socket of the pipe previously laid. The pipe shall then be adjusted and fixed in the correct position and gaskin cculked home so as to fill not more than 1/4th of the total dept or (13 mm. in depth) of the socket.

2.3.2. The remainder of the socket shall be filled with stiff mixture of cement mortar in porportion of one part of cement and one part of sharp sand. When the socket is filled, a fillet, shall be formed round the joints trowel, forming an angle of 45° with the barrel of the pipe.

2.3.3. The mortar shall be mixed as necessary for immediate use.

2.3.4. After the joint is made, any extraneous materials shall be removed from the inside of the joints with a suitable scraper of 'badger'. The newly made joint shall be protected, until set, from the sun, dry winds, rain or *host*, sacking or other suitable materials which shall be used for the purpose.

23.5. The mortar shall be cured to 10 days.

2.4. Testing of Joints: The pipe line shall be tested as directed.

2.4.1. If any leakage is visible, the defective part of the work shall be made good at no extra cost.

2.4.2. A slight amount of sweating which is uniform may be overlooked, but excessive sweating from a particular pipe or joints shall be watched for and taken as indicating a defect to be made good.

### **3.0. Mode of measurements & payment:**

3.1. Pounding or bottaning of the trenches bed to fit the lower part of the pipe and 'Grips' left to take socket, collars etc. are included in the rate of laying the pipes.

3.2. The measurements shall be net without any allowance for cutting and waste. The length of bends, junctions and other connections shall be included in the total length of the drain pipes. Nothing extra shall be paid for the same. The rate includes necessary excavation refilling trenches etc. complete.

33. The rate shall be for a unit of one running metre.

Item No. 39 Providing & fixing double coated Syntex or equivalent PVC (ISI) water tank or required capacity each with all necessary fittings and connection etc. complete on terrace.

## **1.0. MATERIAL**

### **1.1. PVC Water tank**

PVC Water tank of specified capacity and of I.S.I. mark of approved in litters of approved make and quality

Net capacity shall be net volume of water stored between the lowest level of overflow and lowest specified level.

### **1.2. Nipple**

Galvanise pipe nipple shall be of approved make and of best quality

### **1.3. Ball valve**

Ball valve shall be of approved make and of best quality

### **1.4. Connections**

Connections shall be of approved make and of best quality

## **2.0 WORKMAN SHIP**

**2.1.** Tank shall be approved quality and as per IS standard make. Material used in manufacturing tank shall be confirmed to relevant IS code. The material of tank and lead and fittings which may come in contact of water should be such that it does not impart any taste, colour or odour. It does not have any toxic effect and it does not contaminate the water. Thereby making it unpotable.

**2.2.** The tank shall be fixed properly in a level position and making all required necessary correction like inlet outlet flushing overflow and air vent. Tank shall be satisfying the standards of public health.

### **3.0 MODE OF MEASUREMENT & PAYMENT :**

**3.1.** The unit rate PVC tank shall include the cost of all materials, tools and plant required for lifting to required height with all lead and lift, placing & fixing in position, all required specials and jointing adhesive compound, finishing as per direction of the Engineer-in-charge, and all other incidental expenses for producing PVC water tank work of specified diameter to complete the structure or its components as shown on the drawings and according to these specifications. They shall also include the cost of making, fixing and removing of all scaffolding and forms required for the work.

**3.2.** The PVC water tank work shall be measured for its number limiting to specified capacity to those specified on plan or as directed. The rate shall be for a unit of one number.

**3.3.** The payment will be made on number basis of the finished work.

Item No. 40 provdg & fixing M.S. grills of required pattern to wooden frames of window etc. with M.S. flats at required spacings and frame around, square or round bars with round headed bolts and nuts or by screws (A) plain grill

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#### **1.0. Materials**

The structural steel shall conform to M-22 Paint shall conform to M44

#### **2.0. Workmanship**

**2.1.** The M.S. Grill shall be prepared as per the drawing or as directed for fixing to wooden frames of windows etc.

**2.2.** The grill shall be fabricated to the designs and patterns shown in the drawings and the weight shall be as directed, and the joints shall be reverted or welded as shown in the plan or as directed. The grill so formed shall be fixed into the frames of the windows etc. before they are erected in position. The outside strip frame of the grill shall be housed to its full thickness into the recess cut into the frame of the windows etc. The grill shall be fixed to the frame with number of bolts and nuts or screws viz. bolt nut/screw per 30 cm. of the length of outer strip subject to minimum of 2 Nos. on each side of the frame or as indicated in the drawing or as directed.

**2.3.** The bolts and nuts or screws shall be counter sunk and shall be fixed with the top of their heads flush with the face of the frame strips.

**2.4** Grill shall be painted Mat finished oil paint two coats followed by one coat of red lead primer.

#### **3.0. Mode of measurements & payment**

**3.1.** No payment shall be made for weight of screws, bolts nuts etc. only weight of

grill shall be paid.

**3.2.** The rate shall be for a unit of one kg.

Item No- 41 Painting Two coat (Excl.piming coat) on previously painted steel & other metal surfaces with synthetic enamel paint brushing to give an even shade incl. Cleanig the surface of all dirt, dust and other foreign matter.

**1.0. Materials**

Water shall be conform M-1. The plastic emulsion shall conform to I.S.: 5411-1969 (part-I).

**2.0. Workmanship**

**2.1. Scaffolding :** The relevant specifications of item-No. 18.11 Para 2.1 From Building Specification Book shall be followed.

**2.2. Preparation of surface :** The relevant specification of item No. 18.44 Para 2.2 From Building Specification Book shall be followed.

**2.3. Preparation of Mix :**

This shall be done as per manufacture's instructions. The thinning of emulsion is to be done with water and not with turpentine. The quantity of thinner to be added shall be as per manufacturer instructions.

**2.4. Application :**

**2.4.1.** Before pouring into small containers for use, the paint shall be stirred thoroughly in item container. When applying also, the paint shall be continuously stirred in the smaller container, so that its consistency is kept uniform.

**2.4.2.** The paint shall be laid on evenly and smoothly by means of crossing and laying off the crossing and consist of covering the area over with paint, brushing the surface hard for the first time over and then, brushing alternately in opposite direction two or three times and then finally brushing lightly in direction at right angles to the same. In this process, no brush Marks shall be left after the laying off is finished. No hair marks from the brush or clogging of paint puddles in the corners of panels, angles of moldings, etc. shall be left on the work. The full process of crossing and laying off will constitute one coat.

**2.4.3.** The paint shall be applied with brush or rollers. For undecorated surfaces, the surface shall be treated with minimum two coats of cement water proofing paint. The second or subsequent coat shall not be started until the proceeding coat as become sufficiently hard to resist marking by brushing being used.

**2.4.4.** The surface on finishing shall present a flat velvety smooth finish. It shall be even and uniform in shade without patches, brush marks, paint drops etc.

**2.5. Precautions :**

(a) Old brushes if they are to be used with emulsion paints, shall be completely dried of turpentine or oil paint by washing in warm soap water. Brushes shall be quickly washed in water immediately after use and kept immersed in water fusing break periods to prevent the paint from hardening on the brush.

(b) In the preparation of wall for plastic emulsion painting, no oil base petals shall be sued in filling cracks, holes etc.

(c) Splashes on floors etc. shall be cleaned out without delay as they will be difficult to remove after hardening.

(d) Washing or surfaces treated with emulsion paint shall not be done within 3 to 4 weeks of application

**2.6. Protective payment :** The relevant specifications of item No. 18.11 From Building Specification Book shall be followed.

**3.0. Mode of measurements and payment**

**3.1.** The relevant specifications of item No. 18.11 From Building Specification Book shall be followed.

**3.2.** The rate shall be for a unit of One sq. meter.

Item No. 42 Provdg. & fixing gun metal check or nonreturn full way wheel valve. (C)  
25 mm dia.

**1.0. Materials:**

1.1. The gun metal check or non return full way wheel valve of specified dia. shall conform to I.S. 778-1964. The non return valve shall be of tested quality.

**2.0. Workmanship :**

2.1. The gun metal check or non return valve" shall be fully cleared of all foreign matter before fixing. The fixing of valve shall be done by means of bolts nuts and 3 mm. rubber insertions with flanges of spigot and socked tail pieces, drilled to the same specification as in case of socket and spigot and with flanges in case of flanged pipes. The jointing shall be done leak proof.

**3.0. Mode of measurements & payment:**

3.1. The rate includes all labours, materials, tools and plant etc. required for satisfactory completion of this item.

3.2. The rate shall be for a unit of one number.

Item no- 43 Providing and fixing pre-cast Rubber Dye inter locking concrete block 60 mm thick with grade of concrete M-200 pneumatic compressed by mechanically passed and as per approved design including 75 mm sand layer for levelling and filling the joint with sand in proper line and level etc. complete.

Supply of Reflective Type (Wet Cast) finish Interlocking Concrete paving blocks of VYARA make, with - wear resistant aggregates colour coordinated aggregates in face mix. - Colours specified by the architects, using UV resistant colour pigments from Lanxess. - supplied with two coats of UV resistant acrylic lacquer coating

Sr. Parameters Minimum Requirements

1. Percentage Water Absorption Average not over 6%
  2. Compressive strength Average not less than 450 Kg/cm<sup>2</sup>
  3. Average wear in Thickness- Abrasion Average wear not more than 2mm
  4. Tolerance in size (length + breadth)  $\pm 1.5\text{mm}$
  5. Thickness of wearing layer Not less than 5mm
  6. Tolerance in Thickness of block  $\pm 3\text{mm}$
  7. Colours UV Light resistant fast colours from Lanxess only to be used.
- The concrete pavers should confirm to requirements of IS 15658:2006.
  - The manufacturing company must be an ISO 9001:2008 certified Company or should have equivalent quality management systems in place to ensure quality product.
  - The blocks will be made using wear resistant materials in the face mix as specified by the architects.
  - The colours of the blocks (wearing layer) will be as selected by the architects.
  - The blocks must be cured in controlled environment to ensure efflorescence free material.
    - The manufacturer must have in house testing laboratory to carry out all testing including Compressive strength testing, Water absorption, abrasion resistance etc.
  - The concrete pavers should have perpendicularities after release from the mould and the same should be retained until the laying.
  - Compaction of moulds should be done by mechanical vibrators. The vibrator should vibrate in both horizontal & vertical directions simultaneously. Mould should be retained minimum 1&1/2 minutes on table type vibrator's platform.

The top surface should be of anti skid type, should not have pin holes and should be dense. The colour pigment and lacquer coating should not be harmful to concrete. t

- The pavers should have uniform interlocking spacer bars of 2mm to 3mm to ensure compacted sand filling after vibration on the paver surface.
- The manufacturer must have in house testing laboratory to carry out all testing including Compressive strength testing, Water absorption, abrasion resistance etc.
- The concrete pavers should have perpendicularities after release from the mould and the same should be retained until the laying.

Item no- 55 Approved make C.F.L. lamp retrofit 9/11 watt erected if required cat- ii

**Item no. 44 to 55 Specificiaon as per Electrification Book Attached**

Item no- 56 Providing and laying cement concrete 1:3:6 (1- Cement : 3- Coarse sand : 6- crushed stone aggregate 40mm normal size) and curing complete excluding cost of formwork in (A) Foundation and Plinth

**1.0. Materials :** Water shall conform to M-I. Cement shall conform to M-3. Sand shall conform to M-6. Grit shall conform to M-8. Graded stone aggregate 20 mm. nominal size shall conform to M-12.

**2.0. General:**

2.1. The concrete mix is not required to be designed by preliminary tests. The proportion of the concrete mix shall be 1 : 2 :

4 (1 cement: 2 coarse sand ; 4 graded stone aggregate 10 mm. nominal size) by volume.

Concrete work shall have exposed concrete surface or as specified in the item.

2.2. The designation ordinary M-100, M-150, M-200, M-250 specified as per. I.S.

Corresponding approximately to 1 : 3 : 6,

1 : 2 : 4, 1 : 1 1/2 : 3 and 1:1:2 nominal mix of ordinary concrete by volume respectively.

2.3. The ingredients required for ordinary concrete containing one beg of cement of 50 Kg. by weight (0.0342 Cu. M.) for different proportions of mix shall be as under:

Grade of concrete

Total quantity of dry aggregate by volume

per 50 Kgs. of cement to be taken as the

sum of individual volume of fine and

coarse aggregates, maximum

Proportion of fine aggregate to

coarse aggregate

Quantity of

water per 50 Kgs.

of cement

maximum.

1 2 3 4

M-100 (1 : 3: 6) 300 Liters Generally 1 : 2 for fine aggregate 34 Liters

M-150 (1 : 2 : 4) 2.20 " to coarse aggregate by volume 32 "

M-200 (1 : 1 1/2 : 3) 160 " but subject to and upper limit 30 "

M-250 ( 1:1:2) 100 " of 1 : 1 1/2 and lower limit 1 : 3 27 "

2.4. The water cement ratios shall not more than those specified in the above table. The cement content of the mix specified

in the Table shall be increased if the quantity of water in a mix has to be increased to overcome the difficulties of placement and compaction so that the water-cement-ratio specified in the Table is not exceeded.

2.5. Workability of the concrete shall be controlled by maintaining a water-cement-ratio that is bound to give a concrete mix which is just sufficiently wet to be placed and compacted without difficulty with the means available.

2.6. The maximum size of coarse aggregate shall be as large as possible within the limits specified but in no case greater than one fourth of the minimum thickness of the member, provided that the concrete can be placed without difficulty so as to surround all reinforcement thoroughly and to fill the corners of the form.

2.7. For reinforced concrete work, coarse aggregates having a nominal size of 20 mm. are generally considered satisfactory.

2.8. For heavily reinforced concrete members as in the case of ribs of main beams, the nominal maximum size of coarse aggregate should usually be restricted to 5 mm. less than the minimum, clear distance between the main bars, or 5 mm. less than the minimum cover to the reinforcement whichever is smaller.

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2.9. Where the reinforcement is widely spaced as in solid slabs, limitations of size of the aggregate may not be important and the nominal maximum size may sometimes be as great as or greater than the minimum cover.

2.10. Admixture may be used in concrete only with approval of Engineer-in-charge based upon the evidence that with the passage of time, neither the compressive strength of concrete is reduced nor are other requisite qualities of concrete and steel impaired by the use of such admixtures.

### **3.0. Workmanship:**

3.1. Proportioning : Proportioning shall be done by volume, except cement which shall be measured in terms of bags of 50 Kg. weight. The volume of one such bag being taken as 0.0342 Cu. metre. Boxes of suitable sizes shall be used for measuring sand aggregate. The size of the boxes (internal) shall be 35 cms. x 25 cms. and 40 Cms. deep. While measuring the aggregate and sand, the box shall be filled without shaking ramming or hammering. The proportioning of sand shall be on the basis of its dry volume and in case of damp sand, allowances for bulkage shall be made.

### **3.2 Mixing:**

3.2.1. For all work, concrete shall "be mixed in a mechanical mixer which alongwith other accessories shall be kept in first class working condition and so maintained throughout the construction. Measured quantity of aggregate, sand, cement required for each batch shall be poured into the drum of the mechanical mixer while it is continuously running. After about half a minute of dry mixing, measured quantity of water required for each batch of concrete mix shall be added gradually and mixing continued for another one and a half minute. Mixing shall be continued till materials are uniformly distributed and



uniform colour of the entire mass is obtained and each individual particle of the coarse aggregate shows complete coating of mortar containing its proportionate amount of cement. In no case shall the mixing be done for less than 2 minutes after all ingredients have been put into the mixer.

3.2.2. When hand mixing is permitted by the Engineer-in-charge for small jobs or for certain other reasons, it shall be done on the smooth watertight platform large enough to allow efficient turning over the ingredients of concrete before and after adding water. Mixing platform shall be so arranged that no foreign material gets mixed with concrete nor does the mixing water flow out. Cement in required number of bags shall be placed in a uniform layer on top of the measured quantity of fine and coarse aggregate, which shall also be spread in a layer of uniform thickness on the mixing platform. Dry coarse and fine aggregate and cement shall then be mixed thoroughly by turning over to get a mixture to uniform colour. Specified quantity of water shall then be added gradually through a rose-can and the mass turned over till a mix of required consistency is obtained. In hand mixing, quantity of cement shall be increased by 10 percent above that specified.

3.2.3. Mixers which have been out of use for more than 30 minutes shall be thoroughly cleaned before putting in a new batch. Unless otherwise agreed to by the Engineer-in-charge the first batch of concrete from the mixture shall contain only two thirds of normal quantity of coarse aggregate. Mixing plant shall be thoroughly cleaned before changing from one type of cement to another. .

3.3. Consistency: 3.3.1. The degree of consistency which shall depend upon the nature of the work and methods of vibration of concrete, shall be determined by regular slump tests in accordance with I.S. 1199-1959. The slump of 10 mm. to 25 mm. shall be adopted when vibrators are used and 80 mm. when vibrators are not used.

#### **4.4. Inspection:**

3.4.1. Contractor shall give the Engineer-in-charge due notice before placing any concrete in the forms to permit him to inspect and accept the false work and forms as to their strength, alignment, and general fitness but such inspection shall not relieve the contractor of his responsibility for the safety of men, machinery, materials and for results obtained. Immediately before concreting, all forms shall be thoroughly cleaned.

3.4.2. Centering design and its erection shall be got approved from the Engineer-in-charge. One carpenter with helper shall invariably be kept present throughout the period of concreting. Movement of labour and other persons shall be totally prohibited for reinforcement laid in position. For access to different parts, suitable mobile platforms shall be provided so that steel reinforcement in position is not disturbed. For ensuring proper cover, mortar blocks of suitable size shim be cast and tied to the reinforcement. Timber, kapachi or metal pieces shall not be used for this purpose.

### **3.5. Transporting and laying:**

3.5.1. The method of transporting and placing concrete shall be as approved. Concrete shall be so transported and placed that no contamination segregation or loss of its constituent material takes place. All form work shall be cleaned and made free from standing water, dust, snow or ice immediately before placing of concrete.

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No concrete shall be placed in any part of the structure until the approval of the Engineer-in-charge has been obtained.

3.5.2. Concreting shall proceed continuously over the area between construction joints.

Fresh concrete shall not be placed

against concrete which has been in position for more than 30 minutes unless a proper construction joint is formed. Concrete

shall be compacted in its final position within 30 minutes of its discharge from the mixer.

Except where otherwise agreed to

by the Engineer-in-charge concrete shall be deposited in horizontal layers to a compacted depth of not more than 0.45 metre

when internal vibrators are used and not exceeding 0.30 metre in all other cases.

3.5.3. Unless otherwise agreed to by the Engineer-in-charge, concrete shall not be dropped into place from a height exceeding

2 metres. When trucking or chutes are used they shall be kept close and used in such a way as to avoid segregation. When

concreting has to be resumed on a surface which has hardened, it shall be roughened, swept clean, thoroughly wetted and

covered with a 13 mm. thick layer of mortar composed of cement and sand in the same ratio as in the concrete mix itself. This

13 mm. layer of mortar shall be freshly mixed and placed immediately before placing of new concrete. Where concrete has

not fully hardened, all laitance shall be removed by scrubbing the wet surface with wire or bristle brushes, care being taken

to avoid dislodgement of any particles of coarse aggregate. The surface shall then be thoroughly wetted, all free water

removed and then coated with neat cement grout. The first layer of concrete to be placed on this surface shall not exceed 150

mm. in thickness and shall be well rammed against old work, particular attention being given to corners and close spots.

3.5.4. All concrete shall be compacted to produce a dense homogeneous mass with the assistance of vibrators unless,

otherwise permitted by the Engineer-in-charge for exceptional cases, such as concreting under water, where vibrators cannot

be used. Sufficient vibrators in serviceable condition shall be kept at site so that spare equipment is always available in the event of breakdowns.

Concrete shall be judged to be compacted when the mortar fills the spaces between the coarse aggregate and begins to cream

up to form an even surface. Compaction shall be completed before the initial setting starts i.e. within 30 minutes of addition

of water to dry mixture. During compaction, it shall be observed that needle vibrators are not applied on reinforcement which

is likely to destroy the bond between concrete and reinforcement.

**3.6. Curing:** Immediately after compaction, concrete shall be protected from weather, including rain, running water, shocks, vibration, traffic, rapid temperature changes, frost and drying out process. It shall be covered with wet sacking, hassain or other similar absorbant material approved, soon after the initial set and shall be kept continuously wet for a period of not less than 14 days from the date of placement. Masonary work over foundation concrete may be started after 48 hours of its laying but curing of concrete shall be continued for a minimum period of 14 days.

**3.7. Sampling and Testing of concrete :**

3.7.1. Samples from fresh concrete shall be taken as per I.S. 1199-1959 and cubes shall be made, cured and tested at 7 days or 28 days as per requirements in accordance with I.S. 516-1959. A random sampling procedure shall be adopted to ensure that each concrete batch shall have a resonable chance of being tested i.e. the sampling should be spread over the entire period of concreting and cover all mixing units. The minimum frequency of sampling of concrete of each grade shall be in accordance with following :

Quantity of concrete in the work	No. of samples	Quantity of concrete in the works	No. of samples
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1-5Cmt.	1	16-30Cmt.	3
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6-15Cmt.	2	31-50	4
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51 and above	4 + one additional for each additional 50 M.	or part thereof.	
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NOTE : At least one sample shall be taken from each shift. Ten test specimens shall be made from each sample, five for testing at 7 days and the remaining five at 28 days. The samples of concrete shall be taken on each day of the concreting as per above frequency. The number of specimens may be suitably increased as deemed necessary by the Engineer-in-charge when procedure of tests given above reveals a poor quality of concrete and in other special cases.

3.7.2. Tire average strength of the group of cubes cast for each day shall not be less than the specified cube strength of 150

Kg/Cm at 28 days. 20% of the cubes cast for each day may have value less than the specified strength provided the lowest

value is not less than 85% of the specified strength. If the concrete made in accordance with the proportions given for a

particular grade docs not yield the specified strength, such concrete shall be classified as belonging to the appropriate lower,

grade concrete made in accordance with the proportions given for a particular grade shall not, however, be placed in a higher

grade on the ground that the test strength are higher than the minimum specified.

**3.8. Stripping:**

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3.8.1. The Engineer-in charge shall be informed in advance by the contractor of his intention lo strike the form work. While fixing the time for removal of form work, due consideration shall be given to local conditions, character of the structure, the

weather and other condition that influence the setting of concrete and of the materials used in the mix. In normal circumstances (generally where temperatures are above 20 ° C) and where ordinary concrete is used, forms may be struck after expiry of periods specified in item No. 9.1 (A) for respective item of form work.

3.8.2. All form work shall be removed without causing any shock or vibration as would damage the concrete. Before the soffit and struts are removed, the concrete surface shall be exposed, where necessary in order to ascertain that the concrete has sufficiently hardened. Centring shall be gradually and uniformly lowered in such manner as to permit the concrete to take stresses due to its own weight uniformly and gradually. Where internal metal ties are permitted, they or their removable parts shall be extracted without causing any damage to the concrete and remaining holes filled with mortar. No permanently embedded metal part shall have less than 25 mm. cover to the finished concrete surface. Where it is intended to re-use the form work, it shall be cleaned and made good to the satisfaction of the Engineer-in-charge. After removal of form work and shuttering, the Executive Engineer shall inspect the work and satisfy by random checks that concrete produced is of good quality.

3.8.3. Immediately after the removal of forms, all exposed bolts etc., passing through the cement concrete member and used for shuttering or any other purpose shall be cut inside the cement concrete member to a depth of at least 25 mm. below the surface of the concrete and the resulting holes be filled by cement mortar. All fine caused by form joints, all cavities produced by the removal of form ties and all other holes and depressions honeycomb spots, broken edges or corners and other defects shall be thoroughly cleaned, saturated with water and carefully pointed and rendered true with mortar of cement and fine aggregate mixed in the proportions used in the grade of concrete that is-being finished and of as dry consistency as is possible to use. Considerable pressure shall be applied in filling and pointing to ensure thorough filling in all voids. Surfaces which are pointed shall be kept moist for a period of 24 hours. If rock pockets/honeycombs in the opinion of the Engineer in-charge are of such an extent or character to effect the strength of the structure materially or to endanger the life of the steel reinforcement, he may declare the concrete defective and require the removal and replacement of the portions of the structure affected.

#### **4.0. Mode of measurement and payment:**

4.1. The consolidated cubical contents of concrete work as specified in item shall be measured. The concrete laid in excess of section shown on drawings or as directed shall not be measured. No deduction shall be made for

(a) Ends of dissimilar materials such as joists, beams, posts, girders, rafters, purline trusses, corbels and steps etc upto 500 Sq. Cm. in section.

(b) Opening upto 0.1 Sq. M.

4.2. The rate includes cost of all materials, labour, tools and plant required for mixing, placing, position, vibrating and compacting, finishing, as directed, curing and all other incidental expenses for producing concrete lied strength The rate excludes the cost of form work.

4.3. The rate shall be for a unit of one cubic metre.

Item no- 57 Providing and fixing pre-cast Rubber Dye/steel Dye interlocking concrete block 60 mm thick with grade of concrete M300 pneumatic compressed /vibrated mechanically and as per approved design Confirming to IS 15658 : 2006 including 35mm Sand layer for levelling and filling the joint with sand in proper line and level as per guidlines of IRC : SP 63-2018 etc. Complete.

### Scope

Interlocking Concrete Block Pavement (ICBP) shall consist of a surface layer of appropriate sized concrete paving blocks paved and compacted over a thin bedding sand layer of specified grading, which is spread over a properly constructed and profiled base course and is bounded by properly installed edge restraints. The joints shall be filled by fine sand of specified grading. The work shall include supplying laying and paving of blocks including all materials, labour and equipment and performing all operations in connection with the laying of ICBP as per these Specifications.

### 2. Materials

2.1. The Concrete Paving Block shall conform to the relevant IS standard.

2.2. Bedding sand : Bedding sand shall conform to the grading given in Table 1500.6.

2.3. Joint filling sand : Joint filling sand shall conform to grading given in Table 1500.6.

### TABLE : GRADINGS FOR BEDDING AND JOINT FILLING SAND

IS Sieve Size (mm) Per cent Passing

For Bedding Sand For Joint Filling Sand.

Sr.No.	IS Sieve Size (mm )	For Bedding Sand	Per cent Passing For Joint Filling Sand
1	10.00	100	100
2	4.75	90 – 100	90 – 100
3	2.36	60 - 95	75 – 100
4	1.18	15 -34	55 -90
5	0.60	25 -60	35 – 59
6	0.30	5 -20	8 – 30
7	0.15	0 -10	0 -10
8	0.075	0 -5	0 -5

### 4.3. Buffer

Buffer of specified quantity of paving blocks (of the same shape, size and thickness) required for normal maintenance of paved area as specified by the Engineer, shall be supplied and stored for replacement as and when needed. Normally this will be 5 per cent of the blocks used in the paved area.

### 4.4. Block Thickness

For rural roads catering to heavy vehicles, the minimum thickness of paving blocks shall be 60 mm for traffic up to 100 vehicles per day, and 80 mm for projected traffic from 100 to 200 vehicles per day.

### 4.5. Dimensions and Tolerances

The dimensions and tolerances of paving blocks shall conform to the Specifications given in Table 1500.7. Aspect ratio is the ratio of length to thickness of blocks. Chamfer is the bevelled edge, provided on the top surface of a block. Plan area is the horizontal area bounded by the vertical faces. Wearing surface area is the horizontal area bounded by the vertical faces, minus the area reduced due to the presence of chamfer.

**TABLE : DIMENSIONS AND TOLERANCES FOR PAVING BLOCKS**

S. No.	Dimension	Recommended Values	Tolerance Limit	Aspect
(1)	Width W To be specified by Manufacturer		$\pm 2$ mm	
(2)	Length L To be specified by Manufacture		$\pm 2$ mm	
(3)	Thickness T	60 to 80 mm	$\pm 3$ mm	
[Type here] Ratio L/T	Maximum : 4.0		[Type here] $\pm 0.2$	
(4)	Chamfer (Arris) 5 mm	Miximum : Maximum : 7 mm		
		$\pm 1$ mm	Plan Area Maximum : 0.03 m <sup>2</sup>	+0.001 m <sup>2</sup>
(5)	Wearing Face Area	Minimum 75% of Plan Area	-1%	
(6)	Squareness	Nil	$\pm 2$ mm	

### 3. Compressive Strength

3.1. The average 28 days compressive strength of 8 blocks shall be 30 MPa and strength of individual block shall not be less than 26 MPa.

3.2. The 28 days compressive strength of paving blocks tested as per relevant IS specification shall be determined as explained hereinafter.

3.2.1. Compression testing machine of adequate capacity shall be used for testing of blocks. The steel bearing plates shall have a minimum thickness of 25 mm. The surface area of the bearing side of the plate should be such that no edge of the bearing plate is less than 10 mm from the outer edge of the paving block being tested.

3.2.2. In case the testing surface of the paving block departs from a plain surface by more than 0.05 mm, capping using suitable materials shall be adopted for testing as per IS:516.

3.2.3. The blocks shall be stored for  $24 \pm 4$  hours in water maintained at a temperature of  $(20 \pm 5)^{\circ}\text{C}$  before testing. The dimensions and plan areas of the block shall be determined. The bearing plates of the testing machine shall be wiped clean. The specimen shall be clamped between the plates in such a way that the axes of the specimen are vertically aligned with those of the bearing plates.

3.2.4. The load shall be applied without shock and increased continuously at a rate of  $15 \pm 3$  N/mm<sup>2</sup>/minute until no greater load can be sustained by the specimen or delamination occurs. The maximum load applied to the specimen shall be noted..

3.2.5. The apparent compressive strength of individual block shall be calculated by dividing the maximum load (N) by the plan area (mm<sup>2</sup>). The corrected compressive strength shall be calculated by multiplying the apparent compressive strength by the appropriate correction factor from Table 1500.8. The strength shall be expressed to the nearest 0.1 N/mm<sup>2</sup>.

**TABLE 1500.8 : CORRECTION FACTORS FOR THICKNESS AND CHAMFER OF PAVING BLOCK FOR CALCULATION OF COMPRESSIVE STRENGTH**

Paving Block Thickness (mm)	Correction Factor for	
	Plain Block	Chamfered Block
60	1.00	1.06
80	1.12	1.18

3.2.6. Water Absorption: The water absorption being the average of five blocks shall be not more than 6 per cent by mass.

### 3.2.7. Edge Blocks

The edge blocks shall have equivalent cube compressive strength not less than 30 MPa. The road kerbs provided on the edges of the road also serve the purpose of edge blocks. In case the end kerbs are not provided, 300 mm x 300 mm x 150 mm of M30 grade concrete edge blocks or other suitable size as per drawings or direction of the Engineer shall be provided.

### 7.2. Subgrade

The Subgrade shall conform to Clause 1501.5.1 of these Specifications. The soaked CBR of subgrade soil shall not be less than 4 per cent.

### 4.8. Sub-base

The sub-base shall be 100 mm thick granular layer conforming to Clause 401 or 100 mm thick WBM Gr.I conforming to Clause 405 of these Specifications. In case the subgrade soil is clayey, the sub-base shall be extended over the full formation width for proper drainage.

### 4.9. Base Course

A minimum 100 mm thick layer of granular/stabilized base course shall be provided. The base course layer shall be extended beyond the edge restraints. The material shall conform to Clause 402 of these Specifications.

4.10. Bedding Sand . Bedding sand conforming to Table 1500.6 shall be uniformly laid to a compacted thickness of 25 mm for 60 mm thick blocks and 30 mm for 80 mm thick blocks. Bedding sand shall be unloaded in small piles regularly placed over the base course and shall preferably have a moisture content of about 6 per cent which will facilitate its spreading and compaction. Bedding sand shall be screeded in a uniform layer over the base course. The screed can be guided to level by tensioned string lines set above the base course. At the time of screeding, the thickness of sand must allow for the amount by

which it will be subsequently compacted which is normally about 25 per cent more than the compacted thickness. Screeding shall not proceed beyond about 1 m ahead of the planned end of block paving for the day. Sand shall preferably be compacted with a manual, fabricated plate compactor and the level shall be readjusted using the screed.

The surface profile of the screeded bedding sand shall match that required for the completed pavement.

### 4.11. Paving Pattern

The pattern in which blocks are to be paved shall be decided in advance from the two choices or their derived forms available. These are the herringbone and stretcher patterns

4.11.1. By and large, these patterns are the same as adopted for brick paving. All shapes of blocks are not amenable to the above paving patterns. For paving in trafficked areas, herringbone pattern shall be adopted for ensuring better performance. Paving shall commence and progress from one starting line only.

Wherever possible, paving shall commence adjacent to or against edge restraint.

As a guide to the characteristics of typical vibrating plate compactors, standard compactors have a weight of 90 kg, a plate area of 0.3 m<sup>2</sup> and apply a centrifugal force of 1500 kg. Heavy duty compactors weigh between 300 to 600 kg, have a plate area of about 0.5 to 0.6 m<sup>2</sup> and apply a centrifugal force in the range of 2000-3000 kg. Use of heavy duty compactors is desirable for trafficked pavements.

4.12.1. Trial length : The contractor shall lay a trial length of 30 m and get it inspected and approved by the Engineer before proceeding with the regular paving work. The trial length shall be rectified /relaid if found deficient in any respect. The procedure demonstrated in the laying of trial length shall be followed while executing the main construction work.

4.13. Opening to Traffic The pavement can be opened to traffic as soon as the construction work is completed.

4.14.1. Transverse profile : When measured by a camber template, the transverse profile shall not deviate by more than 10 mm from the design profile.

4.14.2. Longitudinal profile: When measured by a 3 m straight edge, the longitudinal profile shall not deviate by more than 12 mm from the design profile.

### 4.15. Acceptance Criteria

From each lot of 500 blocks, 5 blocks shall be selected at random for water absorption and compressive strength tests. In case the number of blocks in the lot is less than 500, a minimum 1 per cent of the blocks delivered to site shall be tested for water absorption and strength. The blocks shall be first tested for water absorption and these shall meet the requirement of Clause 1504.5.2.6 of these Specifications. The same five blocks (or minimum 1 per cent) shall be tested for strength and shall conform to the strength as per Clause 1504.5.1 of these Specifications.

The paved surface shall meet the tolerances for lines, levels, and grades etc. as given in Section 1800 of these Specifications.

### 4.16. Measurements for Payment

The measurement of the paved area shall be in square metres measured from the inner edge of edge restraints on one side of the pavement to the inner edge of the edge restraints on the transverse side of the pavement. The measurement of the edge restraints shall be in number of units or in cubic metres.

#### **4.17. Rate**

The contract unit rate shall include the cost of blocks, cost of stacking, Transportation to site and paving including supply and application of bedding sand and joint filling sand. The rate shall include full compensation for labour, tools, plant, equipment, testing and all incidentals to the work, including all royalties, taxes, storage rents wherever necessary, and all leads and lifts.

Item no- 58 Excavation for foundation upto 1.5 mt.depth including sorting out and stacking of useful materials and disposing of the excavated stuff up to 50meter lead (B) Dense or Hard soil

**4.0.0 (a)** Excavation for foundation upto 1.5 M depth including sorting out and stacking useful materials disposing of the excavated stuff upto 50 metre lead-in loose or soft soil.

**1.0. General: 1.1.** Any soil which generally yields to the application of pickaxes and shovels, phawaras, rakes or any such ordinary excavating implement or organic soil, gravel, silt, sand turf, loam, clay, peat etc., fall under this category.

**2.0 Clearing the site : 2.1** The site on which the structure is to be built shall be cleared and all obstructions, loose stone, materials and rubbish of all kind, bush, wood and trees shall be removed as directed: The materials so obtained shall be property of the Government and be conveyed and stacked as directed within 50 M. lead. The roots of the trees coming in the sides shall be cut and coated with a hot asphalt.

**2.2** The rate of site clearance is deemed to be included in the rate of earth work for which no extra will be paid.

**3.0 Setting out:** After clearing the site, the center lines will be given by the Engineer-in-charge. The contractor shall assume full responsibility for alignment, elevation and dimension of each and all parts of the work. Contractor shall supply labourers, materials, etc. required for setting out the reference marks and bench marks and shall maintain them as long as required and directed.

**4.0 Excavation :** The excavation in foundation shall be carried out in true line and level and shall have the width and depth as shown in the drawings or as directed. The contractor shall do the necessary shoring and shutting or providing necessary slopes to a safe angle, at his own cost. The payment for such precautionary measures shall be paid separately if not specified. The bottom of the excavated area shall be levelled both longitudinally and transversely as directed by removing and watering as required. No earth filling will be allowed for bringing it to level, if by mistake or any other reason excavation is made deeper or wider than shown on the plan or directed. The extra depth or width shall be made up with concrete of same proportion as specified for the foundation concrete at the cost of the contractor. The excavation upto 1.5 m. depth shall be measured under this item.

**5.0. Disposal of the excavated stuff : 5.1.** The excavated stuff of the selected type shall be used in filling the trenches and plinth or levelling the ground in layers including ramming and watering etc. **5.2.** The balance of the excavated quantity shall be removed by the contractor from the site of work to a place as directed with lead upto 50 M. and all lift.

#### **6.0. Mode of measurement and payment:**

**6.1.** The measurement of excavation in trenches for foundation shall be made according to the sections of trenches shown on the drawing or as per sections given by the Engineer-in-charge. No payment shall be made for surplus excavation made in excess of above requirements or due to slopping and sloping back as found necessary on account of conditions of soil and requirements of safety.

**6.2.** The rate shall be for a unit of one cubic metre.



Item no- 59 Providing and laying cement concrete 1:2:4 (1 Cement : 2- Coarse sand : 4- graded stone aggregates 20 mm nominal size) and curing complete excluding cost of formwork in (A) Foundation and Plinth

### 1.0 **Materials**

**Water shall conform to M-1. Cement shall conform to M-3. Sand shall conform to M-6. Grit shall conform to M-8. Graded stone aggregate 20 mm nominal size shall conform to M-12.**

### 2.0 **General**

**2.1.** The concrete mix is not required to be designed by preliminary testes. The proportion of the concrete mix shall be 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm. nominal size) by volume concrete work shall have exposed concrete surface or as specified in the item

**2.2.** The designation ordinary M-100, M-150m M-200, M-250 specified as per I.S. correspond approximately to 1:3:6, 1:2:4, 1:1:1/2:3 and 1:1:2 nominal mix of ordinary concrete by volume respectively

**2.3.** The ingredients required for ordinary concrete containing one beg of cement of 50 kg. by weight (0.0342 Cu M.) for different proportions of mix shall be as under:

Grade of concrete	Total quantity of dry aggregate by volume per 50 kgs. of cement to be taken as the sum of individual volume of fine and coarse aggregates, maximum	Proportion of fine aggregate to coarse aggregate	Quantity of water per 50 Kgs. of cement maximum
1	2	3	4
M-100 (1:3:6)	300 Liters	Generally 1:2 for line aggregate to	34 Liters
M-150 (1:2:4)	220 Liters	coarse aggregate by volume 160 but	32 Liters
M-200 (1:1.1/2:3)		subject to an upper limit of 1:1.1/2	30 Liters
M-250 (1:1:2)	100 Liters	and lower limit	1:3 27 Liters

**2.4.** The water cement ratios shall not be more than specified in the above table. The cement content of the mix specified in the table shall be increased if the quantity of water in mix has to be met eased to overcome the difficulties of placements and compaction so that the water-cement ratio specified in the table is not exceeded.

**2.5.** Workability of the concrete shall be controlled by maintaining a water -cement-ratio that is found to give a concrete mix which is just sufficient wet to be placed and compacted without difficulty with the means available.

**2.6.** The maximum size of course aggregate shall be as large as possible within the limits specified but in no case greater than one forth of the minimum thickness of the member provided that the concrete can be placed without difficulty so as to surround all reinforcement thoroughly and to fill the corners of the form.

**2.7.** For reinforced concrete work; coarse aggregates having a nominal size of 20 mm. are generally considered satisfactory.

**2.8.** For heavily reinforced concrete members as in the case of ribs of main beams, the nominal maximum size of coarse aggregate should usually be restricted to 5 mm. less than the minimum clear distance between the main bar or 5 mm. less than the minimum cover to the reinforcement whichever is smaller.

**2.9.** Where the reinforcement is widely spaced as in solid slabs, limitations of size of the aggregate may not be so important, and the nominal maximum size may some times be as great as or greater than the minimum cover.

**2.10.** Admixture maybe used in concrete only with approval of Engineer-in-charge based upon the evidence that with the passage of time neither the compressive strength of concrete is reduced not are other requisite qualities of concrete and steel impaired by the use of such admixtures.

### 3.0 **Workmanship**

**3.1.** Proportioning : Proportioning shall be done by volume, except which shall be measured in terms of bags of 50 kg. weight, the volume of one such bag being taken as 0.0342 cu. meter Boxes of suitable size shall be used for measuring sand aggregate. The size of boxes (internal) shall be 35 x 25 cms. and 40 cms deep while measuring the aggregate and sand the boxes shall be filled witho ut shaking ramming or hammering. The proportioning of sand shall be on the basis of its dry volume and in case of damp saner, be made allowances for bulk age shall.

### 3.2. **Mixing :**

**3.2.1.** For all work, concrete shall be mixed in a mechanical mixed which along with other accessories shall be. kept in first class working condition and so maintained throughout the construction Measured quantity of aggregate, sand and cement required for each batch shall be poured into the claim of the mechanical mixer while it is continuously running. After half a minute of dry mixing measured quantity of water required for each batch of concrete mix shall be added gradually and mixing continued for another one and a half minute Mixing shall be continued till materials are uniformly distributed and uniform colour of the entire mass is obtained and each individual particle of the coarse aggregate shows complete coating of mortar containing its proportionate amount of cement. In no case shall the mixing he done for less than 2 minutes after-oil ingredients have been put into the mixer.

**3.2.2.** When hand mixing is permitted by the Engineer-in-charge for small jobs or for certain other reasons, it shall be done on the smooth watertight platform large enough to allow efficient turning over the ingredients of concrete before and after adding water. Mixing platform shall be so arranged that no foreign material gets mixed with concrete nor does the mixing water flow out. Cement in required number of bags shall be spread in a layer of uniform thickness on the mixing platform. Dry coarse and fine aggregate and cement shall then be mixed thoroughly by turning over to get a mixture of uniform colour. Specified quantity of water shall then be added gradually through a rose can and the mass turned over till a mix of required consistency is obtained. In hand mixing quantity of cement shall be increased by 10 percent above that specified.

**3.2.3.** Mixers which have been out of use for more than 30 minutes shall be thoroughly cleaned before putting in a new batch. Unless otherwise agreed to by the Engineer-in-charge the first batch of concrete from the mixture shall contain only two thirds of normal quantity of coarse aggregate. Mixing plant shall be thoroughly cleaned before changing from one type of cement to another.

### **3.3. *Consistency:***

**3.3.1.** The degree of consistency which shall depend upon the nature of the work and methods of vibration of concrete, shall be determined by regular slump tests in accordance with I.S. 1199-193. The slump of 10 mm. to 25 mm shall be adopted when vibrators are used and 80 mm. when vibrators are not used.

### **3.4. *Inspection:***

**3.4.1.** Contractor shall give the Engineer-in-charge due notice before placing any concrete in the forms to permit him to inspect and accept the work and forms as to their strength, alignment and general fitness but such inspection shall not relieve the contractor of his responsibility for the safety of men, machinery, materials and for results obtained immediately before concreting. All forms shall be thoroughly cleaned.

**3.4.2.** Centering design and its erection shall be got approved from the Engineer-in-charge. One carpenter with helper shall invariably be kept present throughout the period of concreting. Movement of labour and other persons shall be totally prohibited for reinforcement laid in position. For access to different parts suitable mobile platforms shall be provided so that steel reinforcement in position is not disturbed. For ensuring proper cover, mortar blocks of suitable size shall be cast and tied to the reinforcement. Timber, kapachi or metal pieces shall not be used for this purpose.

### **3.5. *Transporting and laying:***

**3.5.1.** The method of transporting and placing concrete shall be as approved. Concrete shall be so transported and placed that no contamination, segregation or loss of its constituent material takes place. All form work shall be cleaned and made free from standing

water, dust, snow or ice immediately before placing of concrete. No concrete shall be placed in any part of the structure until the approval of the Engineer-in-charge has been obtained.

**3.5.2.** Concreting shall proceed continuously over the area between construction joints. Fresh concrete proper contraction joint is formed. Concrete shall be compacted in its final position within 30 minutes of its discharge from the mixer. Except where otherwise agreed to by the Engineer-in-charge, concrete shall be deposited in horizontal layers to a compacted depth of not more than 0.45 meter when internal vibrators are used and not exceeding 0.30 meter in all other cases.

**3.5.3.** Unless otherwise agreed to by the Engineer-in-charge concrete shall be dropped in to place from a height exceeding 2 meters. When trucking or chutes are used they shall be kept close and used in such a way as to avoid segregation. When concreting has to be resumed on a surface which has hardened, it shall be roughened, swept clean, thoroughly wetted and covered with a 13 mm. thick layer of mortar composed of cement and sand in the same ratio as in the concrete mix itself. This 13 mm. layer of mortar shall be freshly mixed and placed immediately before placing of new concrete. Where concrete has not fully hardened, all laitance shall be removed by scrubbing the wet surface with wire or bristle brushes, care being taken to avoid dislodgement of any particles of coarse aggregate. The surface shall then be thoroughly wetted, all free water removed and then coated with neat cement grout. The first layer of concrete to be placed on this surface shall not exceed 150 mm. in thickness and shall be well rammed against old work, particular attention being given to corners and close spots.

**3.5.4.** All concrete shall be compacted to produce a dense homogeneous mass with the assistance of vibrators, unless otherwise permitted by the Engineer-in-charge for exceptional cases, such as concreting under water, where vibrators cannot be used. Sufficient vibrators in serviceable condition shall be kept at site so that spare equipment is always available in the event of breakdowns. Concrete shall be judged to be compacted when the mortar fills the spaces between the coarse aggregate and begins to cream up to form an even surface. Compaction shall be completed before the initial setting starts i.e. within 30 minutes of addition of water to dry mixture. During compaction, it shall be observed that needle vibrators are not applied on reinforcement which is likely to destroy the bond between concrete and reinforcement.

#### **3.5.5. *Curing:***

**3.5.6.** Immediately after compaction, concrete shall be protected against weather including rain, running water, shocks, vibration, traffic, rapid temperature changes, frost and drying out process. It shall be covered with wet sacking, gunny or other similar absorbent material approved, soon after the initial set, and shall be kept continuously wet for a period of not less than 14 days from the date of placement. Masonry work over foundation concrete may be started after 48 hours of its laying but curing of concrete shall be continued for a minimum period of 14 days.

#### **3.5.7. *Sampling and testing of concrete:***

**3.5.8.** Samples from fresh concrete shall be taken as per I.S. 1199-1959 and cubes shall be made, cured and tested at 7 days and 28 days as per requirements in accordance with I.S. 526-1959. A random sampling procedure shall be adopted to

ensure that each concrete batch shall have a reasonable chance of being tested i.e. the sampling should be spread over the entire period of concreting and cover all mixing units. The minimum frequency of sampling of concrete of each grade shall be in accordance with following:

**3.5.9.**

Quantity of concrete in the work.	No of samples	Quantity of concrete in the works	No of samples
1-5 cmt.	1	16-30 cmt.	3
6.15 cmt.	2	31-50 cmt.	4
51 and above	4+ one additional for each additional 50 mm. or part thereof.		

**3.5.10.** Note : At least one sample shall be taken from each shift, Ten test specimens shall be made from each sample, five for testing at 7 days and the remaining five at 28 days. The samples of concrete shall be taken on each day of concreting as per above frequency. The number of specimens may be suitably increased as deemed necessary by the Engineer-in-charge when procedure of tests given above reveals a poor quality of concrete and in other special cases.

**3.5.11.** The average of the group of cubes cast for each day shall not be less than the specified cube strength of 150 K/g Cm<sup>2</sup> at 28 days. 20% of the cubes cast for each day may have value less than the specified strength provided the lowest value is not less than 85% of the specified strength. If the concrete made in accordance with the proportions given for a particular grade does not yield the specified strength, such concrete shall be classified as belonging to the appropriate lower grade. Concrete made in accordance with the Proportions given for a particular grade shall not, however be placed in a higher grade on the ground that the test strength are higher than the minimum specified.

**3.6. Stripping:**

**3.6.1.** The Engineer-in-charge shall be informed in advance by the contractor of his intention to strike the form work. While fixing the time of removal of form work, due consideration shall be given to local conditions,

**3.6.2.**

**3.6.3.** character of the structure, the weather and other conditions that influence the setting of concrete and of the materials used in the mix. In normal circumstances (generally where temperatures are above 20°C) and where ordinary concrete is used, forms may be struck after expiry of periods specified in item No.9.1 (A) for respective item of form work.

**3.6.4.** All form work shall be removed without causing any shock or vibration as would damage the concrete. Before the soft and struts are removed, the concrete surface shall be gradually exposed, where necessary in order to ascertain that concrete has sufficiently hardened. Centering shall be gradually and uniformly lowered in such a manner as to permit the concrete to take stresses due to its own weight uniformly and gradually. Where internal metal tiles are permitted, they or their removable parts shall be extracted without causing any damage to the concrete and remaining holes filled with mortar. No permanently embedded metal part shall have less than 25 mm. cover to the finished concrete surface. Where it is intended to re-use the form work, it shall be cleaned and made good to the satisfaction of the Engineer-in-charge. After removal of form work and shutting, the Executive Engineer shall inspect the work and satisfy by random checks that concrete produced is of good quality.

**3.6.5.** Immediately after the removal of forms, all exposed bolts etc. passing through the cement concrete member and used for shuttering or any other purpose shall be cut inside the cement concrete member to a depth of at least 25 mm. below the surface of the concrete and the resulting holes be filled by cement mortar, all fins, caused by form joints, all cavities produced by the removal of form tiles and all other holes and depressions, honeycomb spots, broken edges or corners and other defects, shall be thoroughly cleaned, saturated with water and carefully pointed and rendered true with mortar of cement and fine aggregate mixed in proportions used in the grade of concrete that is being furnished and of as dry consistency as is possible to use. Considerable pressure shall be applied in filling and pointing to ensure thorough filling in all voids. Surface which are pointed shall be kept moist for a period of 24 hours. If rock pockets/honeycombs in the opinion of the Engineer-in-charge are of such an extent or character as to effect the strength of the structure materially or to endanger the life of the steel reinforcement, he may declare the concrete defective and require the removal and replacement of the portions of structure affected.

**4.0 Mode of Measurement & Payment**

**4.1.** The consolidated cubical contents of concrete work as specified in item shall be measured. No deduction shall be made for

**4.1.1.** (a) Ends of dissimilar materials such as joints, beams, posts, girders, girders, purling trusses, corbels and steps etc., up to 500 Sq. Cm. in section.

**4.1.2.** The rate includes cost of all materials labour, tools and plant required for mixing, placing in position, vibrating and compacting, finishing, as directed, curing and all other incidental expenses for producing concrete of specified strength. The rate excludes the cost of form work.

**4.2.** The rate shall be for a unit of one cubic meter.

Item no- 60 Providing 15mm thick cement plaster in single coat on brick /concrete walls for interior plastering upto floor two level and finished even and smooth in. (ii)Cement mortar 1:4 (1 cement:4-sand ) with finishing in floating coat of neat cement slurry

**17.58.(I)** 15 mm. thick cement plaster in single coat on fair side pf brick concrete walls for interior plastering upto floor twolevel and finished even and smooth in (i) C.M. 1:3.

**1.0. Materials:** **1.1.** Water M-1. The cement mortar of proportion 1 : 3 shall conform to M-13.

**2.0. Workmanship:**

2.1. Scaffolding : Wooden ballies, bamboos, planks, treaties and other scaffolding shall be sound. These shall be properly examined before erection and use. Stage scaffolding shall be provided for ceiling plaster which shall be independent of the walls.

2.2. Preparation of back-ground:

2.2.1. The surface shall be cleaned of all dust, loose mortar droppings, traces of algae, efflorescence and other foreign matter by water or by brushing. Smooth surface shall be roughened by wire brushing if it is not hard and by racking if it is hard. In case of concrete surface, if a chemical retarder has been applied to the form work, the surface shall be roughened by wire

brushing and all the resulting dust and loose particles cleaned off and care shall be taken that none of the retarders is left on the surface. Trimming of projections on brick/concrete surface where necessary shall be carried out to get an even surface.

2.2.2. Raking of joints in case of masonry where necessary shall -be allowed to dry out for sufficient period before carrying out the plaster work.

2.2.3. The work shall not be soaked but only damped evenly before applying the plaster. If the surface becomes dry such area shall be moistened again.

2.2.4. For external plaster, the plastering operation shall be started from top floor and carried downwards. For internal plaster, the plastering operations may be started wherever the building frame and cladding work are ready and the temporary supporting ceiling resting on the wall of the floor have been removed. Ceiling plaster shall be completed before starting plaster to walls.

**2.3. Applications of plaster :**

2.3.1. The plaster about 15 x 15 cms. shall be first applied horizontally and vertically at not more than 2 metres intervals over the entire surface to serve as gauge. The surfaces of these gauges shall be truly in plane of the finished plastered surface. The mortar shall then be applied in uniform surface slightly more than the specified thickness, then brought to a true surface by working a wooden straight edge reaching across the gauges with small upward and sideways movement at a time. Finally, the surface shall be finished off true with a trowel or wooden float according as a smooth or a sandy granular texture is required. Excessive trowelling or overworking the float shall be avoided. All corners, arrises, angles and junctions be truly vertical or horizontal as the case may be and shall be carefully finished. Rounding or chamfering corners, arrises junctions etc. shall be carried out with proper templates to the size required. 105

2.3.2. Cement plaster shall be used within half an hour after addition of water. Any mortar or plaster which is partially set shall be rejected and removed forthwith from the site.

2.3.3. In suspending the work at the end of the day, the plaster shall be left out clean to the line both horizontally and vertically. When recommencing the plaster, the edges of the old work shall be scraped clean and wetted with cement putty before plaster is applied to the adjacent areas to enable the two to properly join together. Plastering work shall be closed at the end of the day on the body of the wall and nearer than 15 cm. to any corners or arrises. Horizontal joints in plaster work shall not also occur on parapet tops and copings as these invariably lead to leakage. No portion of the surface shall be left out initially to be packed up later on.

2.3.4. Each coat shall be kept damp continuously till the next coat is applied or for a minimum period of 7 days. Moistening shall commence as soon as plaster is hardened sufficiently. Soaking of walls shall be avoided and only as much water as can be readily absorbed shall be used, excessive evaporation on the sunny or windward side of building in hot air or dry weather shall be prevented by hanging matings or gunny bags on the outside of the plaster and keeping them wet.

**3.0. Mode of measurements & payment:**

3.1. The rate shall include the cost of all materials, labour and scaffolding etc. involved in the operations described under workmanship.

Item no- 61 Providing and laying cement concrete flooring 1:2:4 (1-cement : 2-coarse sand : 4-graded stone aggregate 20mm nominal size) laid in one layer and finished with a floating coat of neat cement. (B) 50mm thick.

### 1.0 **Materials**

**Water shall conform to M-1. Cement shall conform to M-3. Sand shall conform to M-6. Grit shall conform to M-8. Graded stone aggregate 20 mm nominal size shall conform to M-12.**

### 2.0 **General**

**2.1.** The concrete mix is not required to be designed by preliminary testes. The proportion of the concrete mix shall be 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm. nominal size) by volume concrete work shall have exposed concrete surface or as specified in the item

**2.2.** The designation ordinary M-100, M-150m M-200, M-250 specified as per I.S. correspond approximately to 1:3:6, 1:2:4, 1:1:1/2:3 and 1:1:2 nominal mix of ordinary concrete by volume respectively

**2.3.** The ingredients required for ordinary concrete containing one beg of cement of 50 kg. by weight (0.0342 Cu M.) for different proportions of mix shall be as under:

Grade of concrete	Total quantity of dry aggregate by volume per 50 kgs. of cement to be taken as the sum of individual volume of fine and coarse aggregates, maximum	Proportion of fine aggregate to coarse aggregate	Quantity of water per 50 Kegs. of cement maximum
1	2	3	4
M-100 (1:3:6)	300 Liters	Generally 1:2 for line aggregate to coarse aggregate by volume 160 but subject to an upper limit of 1:1.1/2 and lower limit	34 Liters
M-150 (1:2:4)	220 Liters		32 Liters
M-200 (1:1.1/2:3)			30 Liters
M-250 (1:1:2)	100 Liters		1:3 27 Liters

**2.4.** The water cement ratios shall not be more than specified in the above table. The cement content of the mix specified in the table shall be increased if the quantity of water in mix has to be met eased to overcome the difficulties of placements and compaction so that the water-cement ratio specified in the table is not exceeded.

**2.5.** Workability of the concrete shall be controlled by maintaining a water -cement-ratio that is found to give a concrete mix which is just sufficient wet to be placed and compacted without difficulty with the means available.

**2.6.** The maximum size of course aggregate shall be as large as possible within the limits specified but in no case greater than one forth of the minimum thickness of the member provided that the concrete can be placed without difficulty so as to surround all reinforcement thoroughly and to fill the corners of the form.

**2.7.** For reinforced concrete work; coarse aggregates having a nominal size of 20 mm. are generally considered satisfactory.

**2.8.** For heavily reinforced concrete members as in the case of ribs of main beams, the nominal maximum size of coarse aggregate should usually be restricted to 5 mm. less than the minimum clear distance between the main bar or 5 mm. less than the minimum cover to the reinforcement whichever is smaller.

**2.9.** Where the reinforcement is widely spaced as in solid slabs, limitations of size of the aggregate may not be so important, and the nominal maximum size may some times be as great as or greater than the minimum cover.

**2.10.** Admixture maybe used in concrete only with approval of Engineer-in-charge based upon the evidence that with the passage of time neither the compressive strength of concrete is reduced not are other requisite qualities of concrete and steel impaired by the use of such admixtures.

### 3.0 **Workmanship**

**3.1.** Proportioning : Proportioning shall be done by volume, except which shall be measured in terms of bags of 50 kg. weight, the volume of one such bag being taken as 0.0342 cu. meter Boxes of suitable size shall be used for measuring sand aggregate. The size of boxes (internal) shall be 35 x 25 cms. and 40 cms deep while measuring the aggregate and sand the boxes shall be filled withot shaking ramming or hammering. The proportioning of sand shall be on the basis of its dry volume and in case of damp saner, be made allowances for bulk age shall.

### 3.2. **Mixing :**

**3.2.1.** For all work, concrete shall be mixed in a mechanical mixed which along with other accessories shall be. kept in first class working condition and so maintained throughout the construction Measured quantity of aggregate, sand and cement required for each batch shall be poured into the claim of the mechanical mixer while it is continuously running. After half a minute of dry mixing measured quantity of water required for each batch of concrete mix shall be added gradually and mixing continued for another one and a half minute Mixing shall be continued till materials are uniformly distributed and uniform colour of the entire mass is obtained and each individual particle of the coarse aggregate shows

complete coating of mortar containing its proportionate amount of cement. In no case shall the mixing be done for less than 2 minutes after oil ingredients have been put into the mixer.

**3.2.2.** When hand mixing is permitted by the Engineer-in-charge for small jobs or for certain other reasons, it shall be done on the smooth watertight platform large enough to allow efficient turning over the ingredients of concrete before and after adding water. Mixing platform shall be so arranged that no foreign material gets mixed with concrete nor does the mixing water flow out. Cement in required number of bags shall be spread in a layer of uniform thickness on the mixing platform. Dry coarse and fine aggregate and cement shall then be mixed thoroughly by turning over to get a mixture of uniform colour. Specified quantity of water shall then be added gradually through a rose can and the mass turned over till a mix of required consistency is obtained. In hand mixing quantity of cement shall be increased by 10 percent above that specified.

**3.2.3.** Mixers which have been out of use for more than 30 minutes shall be thoroughly cleaned before putting in a new batch. Unless otherwise agreed to by the Engineer-in-charge the first batch of concrete from the mixture shall contain only two thirds of normal quantity of coarse aggregate. Mixing plant shall be thoroughly cleaned before changing from one type of cement to another.

### **3.3. *Consistency:***

**3.3.1.** The degree of consistency which shall depend upon the nature of the work and methods of vibration of concrete, shall be determined by regular slump tests in accordance with I.S. 1199-193. The slump of 10 mm. to 25 mm shall be adopted when vibrators are used and 80 mm. when vibrators are not used.

### **3.4. *Inspection:***

**3.4.1.** Contractor shall give the Engineer-in-charge due notice before placing any concrete in the forms to permit him to inspect and accept the work and forms as to their strength, alignment and general fitness but such inspection shall not relieve the contractor of his responsibility for the safety of men, machinery, materials and for results obtained immediately before concreting. All forms shall be thoroughly cleaned.

**3.4.2.** Centering design and its erection shall be got approved from the engineer-in-charge. One carpenter with helper shall invariably be kept present throughout the period of concreting. Movement of labour and other persons shall be totally prohibited for reinforcement laid in position. For access to different parts suitable mobile platforms shall be provided so that steel reinforcement in position is not disturbed. For ensuring proper cover, mortar blocks of suitable size shall be cast and tied to the reinforcement. Timber, kapachi or metal pieces shall not be used for this purpose.

### **3.5. *Transporting and laying:***

**3.5.1.** The method of transporting and placing concrete shall be as approved. Concrete shall be so transported and placed that no contamination, segregation or loss of its constituent material takes place. All work shall be cleaned and made free from standing

water, dust, snow or ice immediately before placing of concrete. No concrete shall be placed in any part of the structure until the approval of the engineer-in-charge has been obtained.

**3.5.2.** Concreting shall proceed continuously over the area between construction joints. Fresh concrete proper contraction joint is formed. Concrete shall be compacted in its final position within 30 minutes of its discharge from the mixer. Except where otherwise agreed to by the engineer-in-charge, concrete shall be deposited in horizontal layers to a compacted depth of not more than 0.45 meter when internal vibrators are used and not exceeding 0.30 meter in all other cases.

**3.5.3.** Unless otherwise agreed to by the Engineer-in-charge concrete shall be dropped in to place from a height exceeding 2 meters. When trucking or chutes are used they shall be kept close and used in such a way as to avoid segregation. When concreting has to be resumed on a surface which has hardened, it shall be roughened, swept clean, thoroughly wetted and covered with a 13 mm. thick layer of mortar composed of cement and sand in the same ratio as in the concrete mix itself. This 13 mm. layer of mortar shall be freshly mixed and placed immediately before placing of new concrete. Where concrete has not fully hardened, all laitance shall be removed by scrubbing the wet surface with wire or bristle brushes, care being taken to avoid dislodgement of any particles of coarse aggregate. The surface shall then be thoroughly wetted, all free water removed and then coated with neat cement grout. The first layer of concrete to be placed on this surface shall not exceed 150 mm. in thickness and shall be well rammed against old work, particular attention being given to corners and close spots.

**3.5.4.** All concrete shall be compacted to produce a dense homogeneous mass with the assistance of vibrators, unless otherwise permitted by the Engineer-in-charge for exceptional cases, such as concreting under water, where vibrators cannot be used. Sufficient vibrators in serviceable condition shall be kept at site so that spare equipment is always available in the event of breakdowns. Concrete shall be judged to be compacted when the mortar fills the spaces between the coarse aggregate and begins to cream up to form an even surface. Compaction shall be completed before the initial setting starts i.e. within 30 minutes of addition of water to dry mixture. During compaction, it shall be observed that needle vibrators are not applied on reinforcement which is likely to destroy the bond between concrete and reinforcement.

#### **3.5.5. *Curing:***

**3.5.6.** Immediately after compaction, concrete weather including rain, running water, shocks, vibration, traffic, rapid temperature changes, frost and drying out process. It shall be covered with wet sacking, hessian or other similar absorbent material approved, soon after the initial set, and shall be kept continuously wet for a period of not less than 14 days from the date of placement. Masonry work over foundation concrete may be started after 48 hours of its laying but curing of concrete shall be continued for a minimum period of 14 days.

**3.5.7.** Sampling and testing of concrete:

**3.5.8.** Samples from fresh concrete shall be taken as per I.S. 1199-1959 and cubes shall be made, cured and tested at 7 days of 28 days as per requirements in accordance with I.S. 526-1959. A random sampling procedure shall be adopted to ensure that each concrete batch shall have a reasonable chance of being tested i.e. the sampling should be spread over the entire period of concreting and cover all mixing units. The minimum frequency of sampling of concrete of each grade shall be in accordance with following:

**3.5.9.**

Quantity of concrete in the work.	No of samples	Quantity of concrete in the works	No of samples
1-5 cm.	1	16-30 cm.	3
6.15 cm.	2	31-50 cm.	4
51 and above	4+ one additional for each additional 50 mm. or part thereof.		

**3.5.10.** Note : At least one sample shall be taken from each shift, Ten test specimens shall be made from each sample, five for testing at 7 days and the remaining five at 28 days. The samples of concrete shall be taken on each day of concreting as per above frequency. The number of specimens may be suitably increased as deemed necessary by the Engineer-in-charge when procedure of tests given above reveals a poor quality of concrete and in other special cases.

**3.5.11.** The average of the group of cubes cast for each day shall not be less than the specified cube strength of 150 K/g Cm<sup>2</sup> at 28 days. 20% of the cubes cast for each day may have value less than the specified strength provided the lowest value is not less than 85% of the specified strength. If the concrete made in accordance with the proportions given for a particular grade does not yield the specified strength, such concrete shall be classified as belonging to the appropriate lower grade. Concrete made in accordance with the Proportions given for a particular grade shall not, however be placed in a higher grade on the ground that the test strength are higher than the minimum specified.

### **3.6. Stripping:**

**3.6.1.** The Engineer-in-charge shall be informed in advance by the contractor of his intention to strike the form work. While fixing the time of removal of form work, due consideration shall be given to local conditions,

**3.6.2.**

**3.6.3.** character of the structure, the weather and other conditions that influence the setting of concrete and of the materials used in the mix. In normal circumstances (generally where temperatures are above 20°C) and where ordinary concrete is used, forms may be struck after periods specified in item No.9.1 (A) for respective item of form work.

**3.6.4.** All form work shall be removed without causing any shock or vibration as would damage the concrete. Before the soft and struts are removed, the concrete surface shall be gradually exposed, where necessary in order to ascertain that concrete has sufficiently hardened. Centering shall be gradually and uniformly lowered in such a manner as to permit the concrete to take stresses due to its own weight uniformly and gradually. Where internal metal tiles are permitted, they or their removable parts shall be extracted without causing any damage to the concrete and remaining holes filled with mortar. No permanently embedded metal part shall have less than 25 mm. cover to the finished concrete surface. Where it is intended to re-use the form work, it shall be cleaned and made good to the satisfaction of the Engineer-in-charge. After removal of form work and shutting, the Executive Engineer shall inspect the work and satisfy by random checks that concrete produced is of good quality.

**3.6.5.** Immediately after the removal of forms, all exposed bolts etc. passing through the cement concrete member and used for shuttering or any other purpose shall be cut inside the cement concrete member to a depth of at least 25 mm. below the surface of the concrete and the resulting holes be filled by cement mortar, all fins, caused by form joints, all cavities produced by the removal of form tiles and all other holes and depressions, honeycomb spots, broken edges or corners and other defects, shall be thoroughly cleaned, saturated with water and carefully pointed and rendered true with mortar of cement and fine aggregate mixed in proportions used in the grade of concrete that is being furnished and of as dry consistency as is possible to use. Considerable pressure shall be applied in filling and pointing to ensure thorough filling in all voids. Surface which are pointed shall be kept moist for a period of 24 hours. If rock pockets/honeycombs in the opinion of the Engineer-in-charge are of such an extent or character as to effect the strength of the structure materially or to endanger the life of the steel reinforcement, he may declare the concrete defective and require the removal and replacement of the portions of structure affected.

### **4.0 Mode of Measurement & Payment**

**4.1.** The consolidated cubical contents of concrete work as specified in item shall be measured. No deduction shall be made for

**4.1.1.** (a) Ends of dissimilar materials such as joints, beams, posts, girders, gables, purling trusses, corbels and steps etc., up to 500 Sq. Cm. in section.

**4.1.2.** The rate includes cost of all materials labour, tools and plant required for mixing, placing in position, vibrating and compacting, finishing, as directed, curing and all other incidental expenses for producing concrete of specified strength. The rate excludes the cost of form work.

**4.2.** The rate shall be for a unit of one cubic meter.

Item no- 62 Providing and laying in ground 110 mm diameter PVC rain Water pipe 6 Kg./ Sq.cm. necessary fittings connection as per detailed drawing as directed by Engineer - in - charge.

## 1.0 Materials

### 1.1 PVC Pipe:

- Pipes shall be **unplasticized PVC (uPVC)** conforming to **IS:4985 – 2021** (*Specification for Unplasticized PVC Pipes for Potable Water Supply*).
- Pressure class: **6 kg/cm<sup>2</sup> (Class 2)**.
- Nominal diameter: **110 mm (Outer Diameter as per IS Standard)**.
- Pipes shall be free from visible defects such as cracks, air bubbles, or deformation.

### 1.2 Fittings:

- Bends, tees, reducers, end caps, inspection pieces, and couplers shall be of **matching class and size**, conforming to
- **IS:7834 – 1987** (*PVC Fittings for Water Supply*).
- Fittings shall be factory-made and free from sharp edges or distortions.

### 1.3 Jointing Material:

- **Solvent cement** suitable for uPVC pipe, conforming to **IS:14182 – 1994**, shall be used.
- Surfaces to be jointed shall be **clean, dry, and dust-free** before applying solvent.

### 1.4 Bedding and Backfill Material:

- Bedding shall consist of **fine sand or selected soil**, 100 mm thick under the pipe.
- Backfill material shall be **soft soil**, free from stones or debris.

## 2.0 General

- All pipes and fittings shall be from **approved manufacturers**.
- Work shall be executed according to **IS:7634 (Part I & II) – 1975** (*Code of Practice for Installation of PVC Pipe Systems*).
- Proper alignment, slope, and level must be maintained as per drawings for effective drainage.

## 3.0 Workmanship

### 3.1 Excavation:

- Trench width shall be sufficient for jointing and backfilling operations.
- Depth of trench shall be as per design to provide proper slope for rainwater discharge.
- Excavated soil shall be stacked separately for reuse.

### 3.2 Bedding and Laying:

- A **100 mm thick bed of fine sand** shall be prepared in the trench.
- Pipes shall be laid **true to line and gradient**, with socket ends facing upstream.
- Joints shall not rest directly on hard objects or stones.

### 3.3 Jointing:

- Pipe ends shall be cleaned and checked for alignment before jointing.
- **Solvent cement** shall be applied evenly on both surfaces, joined quickly, and held for at least 1 minute.



- The joint shall be allowed to **cure for 24 hours** before testing.

### 3.4 Testing:

- Hydraulic pressure test shall be carried out at **1.5 times the working pressure (i.e., 9 kg/cm<sup>2</sup>)** for 10 minutes.
- No visible leakage or pressure drop shall be allowed.

### 3.5 Backfilling:

- After successful testing, trenches shall be refilled in **layers not exceeding 150 mm**, properly watered and compacted.
- Extra soil shall be disposed of within the site as directed.

## 4.0 Measurement

- The measurement shall be taken in **running meters (Rmt)** of completed pipe work including fittings.
- Lengths of specials (bends, tees, reducers, etc.) shall not be deducted.
- Depth of trench, if payable separately, shall be measured as per schedule.

## 5.0 Rate and Payment

### 5.1 The rate shall include:

- Supply of **110 mm dia, 6 kg/cm<sup>2</sup> uPVC pipe** and all specials/fittings.
- **Excavation, bedding, laying, jointing, and testing** complete.
- **Solvent cement, backfilling, watering, and compaction.**
- **All leads, lifts, labour, and incidental expenses** for satisfactory completion.

### 5.2 Unit of Payment:

- Rate shall be for **one running meter (Rmt)** of pipe laid, jointed, tested, and accepted.

Item no- 63 Providing and laying in ground 150mm diameter PVC rain Water pipe 6 Kg./ Sq.cm. necessary fittings connection as per detailed drawing as directed by Engineer - in - charge.

### 1.5 Materials

#### 1.6 PVC Pipe:

- Pipes shall be **unplasticized PVC (uPVC)** confirming to **IS:4985 – 2021** (*Specification for Unplasticized PVC Pipes for Potable Water Supply*).
- Pressure class: **6 kg/cm<sup>2</sup> (Class 2)**.
- Nominal diameter: **110 mm (Outer Diameter as per IS Standard)**.
- Pipes shall be free from visible defects such as cracks, air bubbles, or deformation.

#### 1.7 Fittings:

- Bends, tees, reducers, end caps, inspection pieces, and couplers shall be of **matching class and size**, confirming to
- **IS:7834 – 1987** (*PVC Fittings for Water Supply*).
- Fittings shall be factory-made and free from sharp edges or distortions.

#### 1.8 Jointing Material:

- **Solvent cement** suitable for uPVC pipe, conforming to **IS:14182 – 1994**, shall be used.
- Surfaces to be jointed shall be **clean, dry, and dust-free** before applying solvent.

### 1.9 Bedding and Backfill Material:

- Bedding shall consist of **fine sand or selected soil**, 100 mm thick under the pipe.
- Backfill material shall be **soft soil**, free from stones or debris.

## 2.0 General

- All pipes and fittings shall be from **approved manufacturers**.
- Work shall be executed according to **IS:7634 (Part I & II) – 1975** (*Code of Practice for Installation of PVC Pipe Systems*).
- Proper alignment, slope, and level must be maintained as per drawings for effective drainage.

### 3.6 Workmanship

#### 3.7 Excavation:

- Trench width shall be sufficient for jointing and backfilling operations.
- Depth of trench shall be as per design to provide proper slope for rainwater discharge.
- Excavated soil shall be stacked separately for reuse.

#### 3.8 Bedding and Laying:

- A **100 mm thick bed of fine sand** shall be prepared in the trench.
- Pipes shall be laid **true to line and gradient**, with socket ends facing upstream.
- Joints shall not rest directly on hard objects or stones.

#### 3.9 Jointing:

- Pipe ends shall be cleaned and checked for alignment before jointing.
- **Solvent cement** shall be applied evenly on both surfaces, joined quickly, and held for at least 1 minute.
- The joint shall be allowed to **cure for 24 hours** before testing.

#### 3.10 Testing:

- Hydraulic pressure test shall be carried out at **1.5 times the working pressure (i.e., 9 kg/cm<sup>2</sup>)** for 10 minutes.
- No visible leakage or pressure drop shall be allowed.

#### 3.11 Backfilling:

- After successful testing, trenches shall be refilled in **layers not exceeding 150 mm**, properly watered and compacted.
- Extra soil shall be disposed of within the site as directed.

## 4.0 Measurement

- The measurement shall be taken in **running meters (Rmt)** of completed pipe work including fittings.
- Lengths of specials (bends, tees, reducers, etc.) shall not be deducted.
- Depth of trench, if payable separately, shall be measured as per schedule.

### 5.3 Rate and Payment

#### 5.4 The rate shall include:

- Supply of **110 mm dia, 6 kg/cm<sup>2</sup> uPVC pipe** and all specials/fittings.
- **Excavation, bedding, laying, jointing, and testing** complete.
- **Solvent cement, backfilling, watering, and compaction.**
- **All leads, lifts, labour, and incidental expenses** for satisfactory completion.

#### 5.5 Unit of Payment:

- Rate shall be for **one running meter (Rmt)** of pipe laid, jointed, tested, and accepted.

Item no- 64 Providing formwork of ordinary timber planking so as to give a rough finish including centering shuttering strutting and propping etc. Height of propping and centering below supporting floor to ceiling not exceeding 4M. and removal of the same for in situ reinforced concrete and plain concrete work in. (A) Foundations Footings Bases of Columns etc. and Mass concrete.

#### 1.0. *Materials*

- 1.1. The shuttering to be provided shall be of ordinary timber plank and shall conform to M-26.
- 1.2. The dimensions of scantlings and battens shall conform to the design. The strength of the wood shall not be less than that assumed in the design.

#### 2.0. *Workmanship*

- 2.1. The form work shall conform to the shape lines and dimensions as shown on the plans and be constructed as to remain sufficiently rigid during the placing and compacting of the concrete. Adequate arrangements shall be made by the contractor to safe-guard against any settlement of the form-work during the course of concreting and after concreting. The form work of shuttering, centering, scaffolding, bracing etc. shall be as per design.

#### 2.2. *Clearing and Treatment of forms:*

- 2.2.1. All rubbish, particularly chipping shaving and saw dust shall be removed from the interior of the form before the concrete work is placed and the-form in contact with concrete shall be cleaned and thoroughly wetted or treated. The surface shall be then coated with soap solution applied before concreting is done. Soap solution for the purpose shall be prepared by dissolving yellow soap in water to get consistency of paint. Alternatively a coat of raw linseed oil shall be applied after thoroughly cleaning the surface. Care shall be taken that the coating does not get on construction joint surface and reinforced bars.

#### 2.3. *Stripping time:*

- 2.3.1. In normal circumstances and where ordinary cement is used forms may be struck after expiry of following periods.
- |      |  |                 |
|------|--|-----------------|
| (a)  | Sides of walls columns and vertical faces of beams ..... | 24 to 48 hours. |
| (b)  | Beam soffits, (props, left under).....                   | 7 days.         |
| (c)  | Removal of props slabs:                                  |                 |
| (i)  | Slabs spanning up to 4.5. m.....                         | 7 days.         |
| (ii) | Spanning over 4.5 mm.....                                | 14 days.        |
| (d)  | Removal of props t beams and Arches:                     |                 |
| (i)  | Spanning up to 6 mm.....                                 | 14 days.        |
| (ii) | Spanning over 6 m .....                                  | 21 days.        |

#### 2.4. *Procedure when removing the form work:*

- 2.4.1. All form work shall be removed without such shock or vibrations as would damage the reinforced concrete surface. Before the soffits form work and struts are removed, the soffits and the concrete surface shall be exposed where necessary in order to ascertain that the concrete has sufficiently hardened

#### 2.5. *Centering:*

- 2.5.1. The centering to be provided shall be got approved. It shall be sufficiently strong to ensure absolute safety of the form work and concrete work before, during and after pouring concrete. Watch should be kept to see that behavior or centering and form work is satisfactory during concreting. Erection should also be such that it would allow removal of

forms in proper sequence without damaging either the concrete or the forms to be removed.

**2.5.2.** The props of centering shall be provided on firm foundation or base of sufficient strength to carry the loads without any settlement.

**2.5.3.** The centering and form work shall, be inspected and approved by the Engineer-in-charge before concreting. But this will not relieve the contractor of his responsibility for strength, adequacy and safety of form work and centering. If there is a failure of form work or centering, contractor shall be responsible for the damages to property.

## **2.6. Scaffolding:**

**2.6.1.** All scaffolding, hoisting arrangements and ladders etc., required for the facilitating of concreting shall be provided and removed on completion of work by contractor at his own expense. The scaffolding, hoisting

arrangements and ladders etc. shall be strong enough to with stand all live, dead and impact loads expected to act and shall be subject to the approval of the Engineer-in-charge. However contractor shall be solely responsible for the safety of the scaffolding, hoisting arrangement, ladders, work and workman etc. **2.6.2.** The scaffolding, hoisting arrangements and ladder shall allow easy approach to the work spot and afford easy inspection.

**2.6.3.** The rate is applicable to all condition of working and height up to 4 mts. The rate shall include the cost of materials and labour for various operations involved such as:

- (a) Splayed edges, notching, allowance for overlaps and passing at angles, battens centering, shuttering propping, bolting, wedging easing, striking and removal.
- (b) Filletting to form stop chamfered edges or splayed external angles not exceeding 20 mm: width to beams, columns and the like.
- (c) Temporary openings in the forms for pouring concrete, if required removing rubbish etc.
- (d) Dressing with oil to prevent adhesion of concrete with shuttering and.
- (e) Raking or circular cutting.

## **2.7. Re-Use:**

**2.7.1.** Before re-use, all form shall be inspected by Engineer-in-charge and their suitability ascertained. The forms shall be scarred, cleaned and joints are gone over, repaired where required. Inside surface shall be retreated to prevent adhesion of concrete.

## **3.0. Mode of Measurements & Payment**

**3.1.** From work shall be measured as the area in square meters to shuttering in contract with concrete except in the case of inclined member and portion of curved profile and upper side in which case on area of underside shall be measured for payment.

**3.1.** From work to secondary beams shall be measured up to the sides of main beams but no deduction shall be made from the form work of the main beam at the inter section point. No deduction shall be made from the form work of a column at inter section of beams.

**3.2.** The rate is for the completed item

**3.3.** The rate shall be for a unit of one sq. meter.

Item no- 65 Supplying of crushed stone aggregate of 25 to 40 mm size as directed with 5 Km. lead

## **1.0 Materials**

### **1.1 Stone Aggregate:**

- The coarse aggregate shall consist of **hard, durable, crushed stone** obtained from approved quarry sources.
- Stones shall be **angular in shape** and free from dust, clay, organic matter, or other deleterious substances.
- Flaky, elongated, or soft particles shall not exceed **15% by weight**.
- The aggregate shall conform to **IS: 383 – 2016** (*Specification for Coarse and Fine Aggregates for Concrete*).

### **1.2 Size Range:**

- The supplied material shall be **machine crushed** and screened to obtain sizes **25 mm to 40 mm**.
- The gradation shall meet the following limits:

Sieve Size (mm)	Percentage Passing
40	100
25	35 – 70
20	0 – 15

10	0 – 5
----	-------

### 1.3 Physical Properties:

Property	Requirement	Test Reference
Aggregate Crushing Value	$\leq 30\%$	IS:2386 (Part 4)
Los Angeles Abrasion Value	$\leq 40\%$	IS:2386 (Part 4)
Water Absorption	$\leq 2\%$	IS:2386 (Part 3)
Specific Gravity	$\geq 2.6$	IS:2386 (Part 3)

### 1.4 Water (if used for washing):

- Water shall be clean, potable, and free from salts or organic impurities.

## 2.0 General

- The contractor shall obtain material only from an **approved quarry** having crushing and screening facilities.
- The material shall be screened to required size before dispatch.
- All **royalty, quarry fees, seigniorage, and taxes** shall be borne by the contractor.

## 3.0 Workmanship

### 3.1 Collection and Loading

- Crushed stone aggregates shall be collected, screened, and loaded into trucks mechanically.
- Aggregates shall be clean and uniformly graded at the time of dispatch.

### 3.2 Transportation

- The material shall be transported to site by **trucks/tippers** within a **lead of 5 km**.
- The truck shall be covered with tarpaulin to avoid loss or contamination during transit.

### 3.3 Unloading and Stacking

- Aggregates shall be unloaded on **dry, level ground**, free from mud or vegetation.
- Stacks shall be **uniform, measurable, and separated by size** (if multiple sizes are used).
- Stacks shall be measured in cubic meters (m<sup>3</sup>) for payment.

## 4.0 Measurement

- Measurement shall be taken in **cubic meters (m<sup>3</sup>)** of stacked quantity at site.
- For volume computation, **a deduction of 7%** shall be made towards voids as per standard PWD practice.

## 5.0 Rate and Payment

### 5.1 The rate shall include:

- Cost of crushed stone aggregate (25–40 mm) from approved quarry,
- Royalties, taxes, quarry fees, seigniorage charges,
- Loading, unloading, stacking, and transportation up to 5 km lead,
- All labour, tools, and incidental works for proper completion.

## 5.2 Mode of Payment:

- Payment shall be made per cubic meter (m<sup>3</sup>) of aggregate supplied, stacked, and accepted by the Engineer-in-Charge.

Item no- 66 Supplying of coarse sand as directed with 5 Km. lead

### 1.0 Materials

#### 1.1 Coarse Sand:

- Coarse sand shall be **natural river sand** or **crushed stone sand** obtained from an approved source.
- The sand shall be **clean, sharp, angular**, and free from clay, loam, mica, salts, and organic impurities.
- It shall conform to **IS: 383 – 2016** (*Specification for Coarse and Fine Aggregates for Concrete*).
- **Fineness Modulus (F.M.)** shall be between **2.5 to 3.0** for coarse sand.

#### 1.2 Quality Requirements:

Property	Requirement
Clay, silt & dust content	Not more than 3% by weight
Organic impurities	Shall not exceed the color limit of standard solution as per IS:2386 (Part 2)
Bulk density	1500–1700 kg/m <sup>3</sup> (approx.)
Grading	Zone I or Zone II (as per IS:383)

#### 1.3 Water (if used for washing):

- Water used for washing or cleaning sand shall be clean, potable, and free from salts or acids.

## 2.0 General

- The contractor shall supply coarse sand **from an approved quarry or river bed source**, ensuring quality and quantity as per direction of Engineer-in-Charge.
- The sand shall be **stacked properly in measurable heaps** at the specified site or godown.
- All **royalty, quarry fees, seigniorage, and taxes** shall be included in the supply rate.

## 3.0 Workmanship

### 3.1 Collection and Loading

- The sand shall be collected from the approved source, screened, and cleaned of all impurities before dispatch.
- Loading shall be done manually or mechanically into trucks or trolleys ensuring no contamination with foreign materials.

### 3.2 Transportation

- Sand shall be transported by **trucks, tractors, or tippers** over a distance not exceeding **5 km lead**, as specified.
- During transport, suitable measures (like tarpaulin cover) shall be taken to avoid loss of material.

### 3.3 Unloading and Stacking

- Sand shall be unloaded at site and **stacked on a dry, level, and well-prepared ground** to prevent contamination.
- Stack dimensions shall be recorded for volume measurement.
- A typical stack shall have **1.25 m height** and side slopes not steeper than **1:2**.

### 4.0 Measurement

- Measurement shall be done in **cubic meters (m<sup>3</sup>)** of stacked quantity at site.
- A deduction of **8% for voids** shall be made from the measured stack volume to arrive at net supply quantity (as per standard PWD practice).

### 5.0 Rate and Payment

5.1 The rate shall include the cost of:

- **Material (Coarse Sand)** with approved quality,
- **Royalties, taxes, quarry fees**, and seigniorage charges,
- **Loading, unloading, and stacking** at site,
- **Transportation with 5 km lead**, and
- All **labour, tools, and incidental works** required for satisfactory completion.

5.2 Payment shall be made per **cubic meter (m<sup>3</sup>)** of sand supplied and accepted by the Engineer-in-Charge.

**Name of Work :- Const. Of Various Anganwadi Building in Dascroi Taluka  
Dist. Ahmedabad Package No. AHD/ANGWNADI/12 (2026-2027) (Zanu-1,  
Gatrad-5, Pardhol-3 ) Total -3**

**SCHEDULE FOR TESTING OF MATERIALS**

For ensuring quality control and workmanship, Various tests prescribed below for materials shall be taken at periodical intervals as stipulated below.

The materials shall be got tested at Government recognised Laboratory, (R & B) of field Laboratory of GERI (R & B) for which 1 % of the estimated amount pur to Tender shall be recovered from the contractor from the R.A. bills and final bills at the testing charges shall be paid to the GERI by the Government However if the charges increase over 1 % no excess recovery shall be made from the contractor as per resolution of B & C Department dated 10<sup>th</sup> May 1985 vide TNC/1085 (4)s.

Item No. as per schedule B	Brief Description of Materials to be tested	Qty. of Materials	Prescription of test which shall be carried out	Frequency @ which test shall be carried out	Total No. of Test to be taken
	40 MM	32	Gradation Test	1 to 100 Cmt – 1 Test	1
	20 MM	100		100 to 500 cmt – 3 Test	3
	25 to 40 mm metal		Impact value	500 to 1500 cmt – 5 Test	
	10 to 20 mm kapchi		Flakiness Index	1500 to 5000 cmt – 7 Test	
	6 mm size grit				
	10 to 12 mm kapchi				
	6 to 10 mm grit				
	19.20 to 26.5 mm				
	13.20 to 19.20 mm				
	4.75 to 13.20 mm				
	2.36 to 4.75 mm				
	5.60 to 11.20 mm				
	2.80 to 5.60				
	Quarry Spall				
	40 mm nominal sie				
	20 mm MCBT				
2	Sand		Stripping Value	-As above-	
3	Murum		P. I. Value	One test per / 50 Cmt	
4	Sand	56	Silt Content	One test per work	1
	Stone dust		Gradation	One test per 200 Cmt	
5	Asphalt		1 Penetration Test as per I.S. 1203	No. of Tankar	Test
	(ii) Emulsion			1 to 10	1
				11 to 20	2
				21 to 50	3
				50 to 100	4
				Remaining every 50 tankar	
				1	
			2. Ductility Test	As per I.S. 1208	
			3. Specification Gravity Test	As per I.S. 1202	
			4. Softening point Test	As per I.S. 1204	
			5. Viscosity Test	As per I.S. 1206	



6	Tack coat		Binder temperature for application	Irregular close in intervals Two tests per day		
			Rate of spread of binder			
7	WOOD					
	Water					1
8	Bricks	676.65	Water absorption	1 test per 50000 Bricks		2
			Efflorence			
			Size			
			Compressive Strength			
9	Cement	69.26	Consistency	Up to 50 T	1 test	2
			Setting time	100 T	2 tests(As per	
			Compressive stemgth	200 T	3 tests GERI	
			Fineness	300 T	4 tests Manual	
			Chemical analysis	500 T	5 Tests 2002)	
			Soundess	800 T	6 tests	
				1300 T	7 tests	
				and 8 tests for longer consingment		
10	Steel T.M.T. Bar	7.40	Tensile Strength	1 Test/40tonnes/per category		1
	M.S. Bar		Yield Stress			1
			Elongation			1
			Size			
11	C C cube 1.1.5.3		Compressive Strength	Only C.C. M.P	No. of test	
	M-100	33.60	(I.S. 516 – 1959)	1 to 5	1 No	4
	M-150			6 to 15	2 No	
	M-200 (1:1.5:3)	107.48		16 to 20	3 No	7
	M-250			31 to 50	4 No	
	C.C. 1:3:6	4.00		51 & above	4 + 1	1
				(For each additional 50 or part thereof)		

The number of test will be as per Manual of Quantity Control of latest Govt. G.R./ Circulars will be final .

The Contractor shall have to pay 1 % of the estimate cost put to tenders all testing of materials & same shall be deducated from their bills for the works. The testing of various materials shall be carried out in DERI and result received shall be binding to all i.e. the contractor and Govt.

Testing charges of GERI shall be born by Govt. No refund be made nor extra charges over 1 % shall be recoverable from the ccontractor.s

Deputy Executive Engineer  
R & B Panchayat Sub Division  
Ahmedabad

Executive Engineer  
R & B Panchayat Division  
Ahmedabad