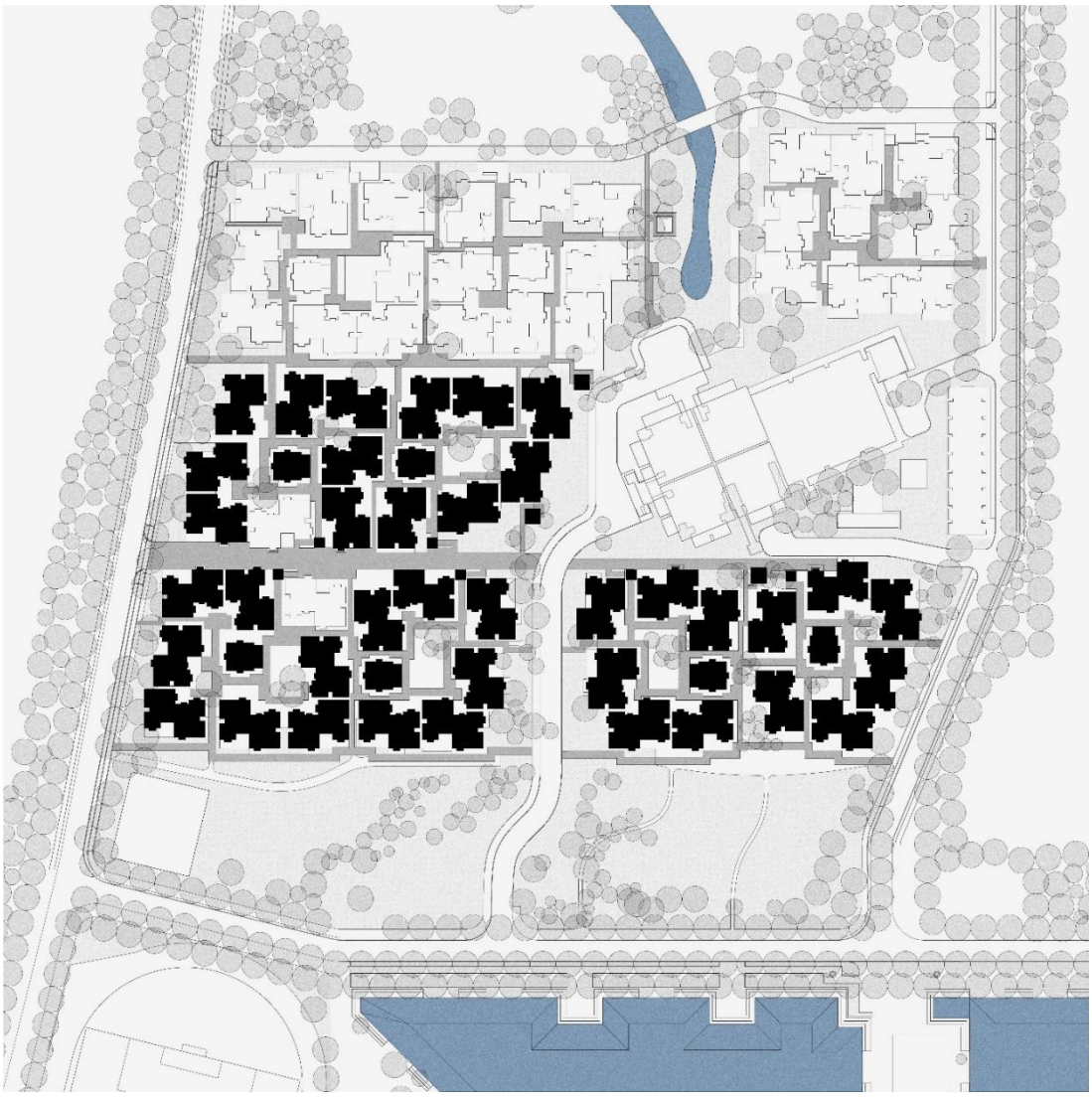
TENDER FOR CONSTRUCTION AND DEVELOPMENT WORKS OF 38 NOS. STUDENT HOSTEL BUILDINGS AT

NALANDA UNIVERSITY, RAJGIR



TECHNICAL SPECIFICATIONS PART- I

(CIVIL WORKS)

TECHNICAL SPECIFICATIONS FOR CIVIL WORKS PART-I

CONTENTS

SUB HEAD: 0.0

GENERAL

GENERAL

0.1 Reference mentioned herein shall be applicable to all sections to the extent the context permits and are intended to supplement the provisions in the particular section. In case of any discrepancy/ deviation, the provisions in the particular section shall take precedence.

0.2 The rates for all items of work unless clearly specified otherwise shall include cost of all labour, materials and other inputs involved in the execution of the items.

0.3 INTERPRETATIONS

0.3.1 The Tender authority shall be the sole deciding authority as to the meaning, interpretation and implications for various provisions of the specifications. His decision in writing shall be final.

0.3.2 Wherever any reference is made to any Indian Standard, it shall be taken as reference to the latest edition with all amendments issued thereto. In the event of any variation between the detailed specifications and the Indian Standard, the former shall take precedence over the latter.

0.3.3 General Notes: All the works are to be carried out as per latest specifications of CPWD/MES/Indian Railways/State PWD, and relevant IS Codes unless otherwise specified in BOQ. Measurements of all the items of work will be done as per IS 1200 with its latest revisions, unless otherwise specified in BOQ or detailed specifications. In the absence of all the above three, general engineering practice followed in construction industry or the local customs will be followed. Unless otherwise specified the rates of various items will be for all heights, leads and lifts.

0.4 DEFINITIONS

The following terms and expressions in the specifications shall have the meaning or implication hereby assigned to them unless otherwise specified elsewhere.

0.4.1 ***Contractor:*** The Contractor shall mean the individual or firm or company whether incorporated or not, undertaking the works and shall include the legal personal representatives of such individual or the persons composing such firm or company, or the successors of such individual or firm or company and the permitted assignees of such individual or firm of company.

0.4.2 ***Engineer-in-Charge:*** The 'Engineer-in-Charge' means the person appointed by NU who shall supervise and be in-charge of the work.

0.4.3 ***Site:*** The 'site' shall mean the land/ or other places on, in, into or through which the work is to be executed under the contract or any adjacent land, path or street through which the work is to be executed under the contract, or any adjacent land, path or street which may be allotted or used for the purpose of carrying out the contract.

0.4.4 ***Store:*** The 'store' shall mean the place of issue of materials.

0.4.5 ***IS:*** The standards, specification and code of practices issued by the Bureau of Indian Standards.

0.4.6 ***Best*****:** The word 'best' when used shall mean that in the opinion of the Tender Authority, there is no superior material/ article and workmanship obtainable in the market and trade respectively. As far as possible the standard required shall be specified in preference to the word 'best'.

0.5 FLOOR AND LEVELS

0.5.1 Building

0.5.1.1 Floor 1 shall mean plinth level of respective area of individual building. The floors above floor 1 shall be numbered in sequence as floor 2, floor 3 and so on. The number shall increase upwards.

0.5.1.2 Floor level: For floor 1, top level of finished floor shall be the floor level and for all other floors above floor 1, top level of the structural slabs shall be the floor level.

0.5.1.3 Plinth level: Floor 1 level

0.5.2 Special Structures

0.5.2.1 For structures like retaining walls, wing walls, chimneys, overhead reservoirs/ tanks and other elevated structures, where elevations/ heights above a defined datum level have not been specified and identification of floors cannot be done as in case of building. Level, at 1.2 m above the ground level shall be the floor 1 level as well as plinth level. Level at a height of 3.5 m above floor 1 level will be reckoned as floor 2 level and level at a height of 3.5 m above the floor 2 level will be floor 3 level and so on, where the total height above floor 1 level is not a whole number multiple of 3.5 meter. Top most floor level shall be the next in sequence to the floor level below even if the difference in height between the two upper most floor levels is less than 3.5 meters

0.6 FOUNDATION AND PLINTH

The work in foundation and plinth shall include: shall mean plinth level of respective area of individual building

(a) For buildings and basements: All works up to respective plinth level or up to floor 1 level.

(b) For abutments, piers and well staining: all works up to 1.2 m above the bed level:

(c) For retaining wall, wing walls, compound walls, chimneys, overhead reservoirs/ tanks and other elevated structures: All works up to 1.2 meter above the formation ground level

(d) For reservoirs/ tanks (other than overhead reservoirs/ tanks): All works up to 1.2 meter above the formation ground level:

0.7 MEASUREMENTS

0.7.1 in booking dimensions, the order shall be consistent and in the sequence of length, width and height or depth or thickness.

0.7.2 Rounding off: Rounding off where required shall be done in accordance with IS: 2-1960. The number of significant places rounded in the rounded off value should be as specified.

0.8 MATERIALS

0.8.1 Samples of all materials to be used on the work shall be got approved by the contractor from the Engineer-in-Charge/Design consultant/Client well in time. The approved samples duly authenticated and sealed shall be kept in the custody of the Engineer-in-Charge till the completion of the work. All materials to be provided by the contractor shall be brand new and as per the samples approved by the Engineer-in-Charge.

0.8.2 Materials obtained by the contractor from the sources approved by the Client shall be subjected to the Mandatory tests. Where such materials do not conform to the relevant specifications, the matter shall be taken up by the Engineer-in-Charge for appropriate action against the defaulters. In all such cases, necessary documents in original and proof of payment relating to the procurement of materials shall be made available by the contractor to the Engineer-in-Charge.

0.8.3 Samples, whether submitted for approval to govern bulk supplies or required for testing before use and also the sample of materials bearing 'Standard mark,' if required for testing, shall be provided free of cost by the contractor. All other incidental expenditure to be incurred for testing of samples e.g. packaging, sealing transportation, loading, unloading etc. except testing charges shall be borne by the contractor.

0.8.4 The materials, supplied by the Client shall be deemed to be complying with the specifications.

0.8.5 Materials stored at site, depending upon the individual characteristics, shall be protected from atmospheric effects due to rain, sun, wind and moisture to avoid deterioration.

0.8.6 Materials like timber, paints etc. shall be stored in such a way that there may not be any possibility of fire hazards. Inflammable materials and explosives shall be stored in accordance with the relevant rules and regulations or as approved by Engineer-in-Charge in writing so as to ensure desired safety during storage.

0.8.7 The unit weight of materials unless otherwise specified shall be reckoned as given in IS: 1911-1967.

0.9 SAFETY IN CONSTRUCTION

0.9.1 The contractor shall employ only such methods of construction, tools and plant as are appropriate for the type of work or as approved by Engineer-in-Charge in writing.

0.9.2 The contractor shall take all precautions and measures to ensure safety of works and workman and shall be fully responsible for the same. Safety pertaining to construction works such as excavation, centering and shuttering, trenching, blasting, demolition, electric connections, scaffolds, ladders, working platforms, gangway, mixing of bituminous materials, electric and gas welding, use of hoisting and construction machinery shall be governed by relevant safety codes and the direction of Engineer-in-Charge

0.10 ABBREVIATIONS

The following abbreviations wherever they appear in the specifications, shall have the meaning or implication hereby assigned to them:

Mm	Millimeter
Cm	Centimeter
M	Meter
Km	Kilometer
Mm^2/sqmm	Square Millimeter
Cm^2/sqcm	Square centimeter
Dm^2/sqdm	Square decimeter
M^2/sqm	Square meter
Cm^3/ cubic cm	Cubic centimeter
Dm^3/ cubic dm	Cubic decimeter
M^3/cum	Cubic meter
Ml	Milliliter
Kl	Kiloliter

Gm	Gram
Kg	Kilogram
Q	Quintal
T	Tonne
Fps system	Foot pound second system
°C	Degree Celsius temperature
Fig	Figure
Re/Rs	Rupee/ Rupees
No	Number
Dia	Diameter
AC	Asbestos cement
CI	Cast Iron
GC	Galvanized corrugated
GP	Galvanized plain
GI	Galvanized iron
PVC	Polyvinyl chloride
RCC	Reinforced cement concrete
SW	Stone ware
SWG	Standard wire Gauge

SUB HEAD: 0.1

CARRIAGE OF MATERIALS

Please refer to CPWD Specifications Volume I – 2019 Page No. 9 to 24 (with its latest corrections slips up to the date of submission of the tender).

SUB HEAD: 0.2
MORTARS

Please refer to CPWD Specifications Volume I – 2019 Page No.59 to 80 (with its latest corrections slips up to the date of submission of the Tender.

Contractor shall strictly follow the procedure laid down in the above specifications for quality of Materials, Mixing of mortar and use of the same in various work heads like, Masonry, Flooring, and Plastering etc.

Contractor shall also be responsible for ascertaining the quality of mortar through testing as specified in these specifications and as per relevant Indian Standards at specified frequency.

SUB HEAD: 1.0

PILE WORK

Please refer to Relevant Paras for Cast in Situ Bored Piles of CPWD Specifications Volume II – 2019 Page No.1075 to 1118 (with its latest corrections slips up to the date of submission of the Tender.

Contractor shall strictly follow the procedure laid down in the above specifications for quality of Materials, Boring of Piles, Equipment to be used and Testing of Piles.

Contractor shall also be responsible for ascertaining the Load Carrying capacities through Relevant Pile testing as specified in these specifications and as per relevant Indian Standards at specified frequency.

TERMINOLOGY

Allowable Load: It is load which is applied to a pile after taking into account its ultimate load capacity, pile spacing, Overall bearing capacity of the ground, the allowable settlement, negative skin friction including reversal of loads.

Bearing Pile: A pile formed in the ground for transmitting load of a structure to the soil by the resistance developed at its tips and or along its surface. It is either vertical or batter pile. It may be 'End bearing pile' or friction pile if it supports the load primarily along the surface.

Boerd Compaction Pile: It is bored cast-in-situ with or without bulb. In this compaction of surrounding ground and freshly filled concrete in pile, bore is simultaneously achieved by suitable method. A pile with a bulb is called an "under-reamed bored compaction pile". Under-reamed pile with more than one bulb is called Multi-under-reamed pile.

Constant Rate of Penetration (CRP) Test: The ultimate bearing capacity of preliminary piles and piles which are not used as working piles.

Constant Rate of Uplift (CRU) Test: The ultimate capacity in tension of preliminary piles and piles which are not used as working piles.

Cut of Level: It is the level where the installed pile is cut off to support the pile caps or beams.

Datum Bar: A rigid bar placed on immovable supports.

Draft Bolt: A metal rod driven into hole bored in timber, the hole being smaller in diameter than the rod.

Drop of Stroke: The distance through which the driving weight is allowed to fall for driving the piles.

Factor of Safety: It is the ratio of the ultimate load capacity of a pile to the safe load of a pile.

Follower Tube: A tube which is used following the main casing tube and it requires to be extended further. The inner diameter of the follower tube should be the same as the inner diameter of casing. The follower tube shall preferably be an outside guide and should be water tight when driven in water- bearing strata or soft clays.

Initial Test: This test is carried out with a view to determine ultimate load capacity and safe load capacity.

Raker or Batter Pile: The pile which is installed at an angle to the vertical. Raker piles are normally provided where vertical piles cannot resist the required applied horizontal forces. The maximum rake to be permitted in piles shall not exceed –

1 in 8 for cast-in-situ piles of large diameter viz. 750 mm dia, and above.

1 in 5 for smaller dia. cast-on-situ piles.

1 in 4 pre-cast piles.

Routine Test: It is carried out with a view to check whether pile is capable of taking the working load assigned to it.

Safe Load: It is the load arrived at by applying a factor of safety to the ultimate load capacity of the pile.

Set: The net distance by which the pile penetrates in the ground due to stated number of blows of the hammer.

Spliced Pile: A pile composed of two or more lengths secured together, end to end to form one pile.

Test Pile: A pile which is selected for load testing and which is subsequently loaded for that purpose. This pile may form working pile itself if subjected to a routine load test with up to one and half time the safe load.

Total displacement (Gross): The total movement of the pile under a given load.

Total Elastic Displacement: This is the magnitude of the displacement of the pile due to rebound caused at the top after removal of given test load. This comprises two components as follows:

(a) Elastic displacement of the soil participating in load transfer; and
(b) Elastic displacement of the pile shaft.

Trial Piles: These are installed initially to assess the load carrying capacity, it is either tested to ultimate bearing capacity or twice the estimated safe load.

Ultimate Load Capacity: The maximum load which a pile can carry before failure of ground (when the soil fails by shear) or failure of pile materials.

Working Load: It is a load assigned to a pile as per design.

Working Pile: It is a pile forming part of foundation of a structural system.

ITEM WISE SPECIFICATIONS OF PILE WORK

DSR Item No. 20.2.3 : Boring, providing and installing bored cast-in-situ reinforced cement concrete piles of grade M-25 of specified diameter and length below the pile cap, to carry a safe working load not less than specified, excluding the cost of steel reinforcement but including the cost of boring, with bentonite solution and temporary casing of appropriate length for setting out and removal of same and the length of the pile to be embedded in the pile cap etc. by percussion drilling using direct mud circulation (DMC) or Bailer and chisel technique by tripod and mechanical winch machine all complete, including removal of excavated earth with all lifts and leads (Length of pile for payment shall be measured up to bottom of pile cap).
(a) : 450 mm dia piles
DSR Item No. 20.2.4 : (b) 500 mm dia piles
DSR Item No. 20.2.5: (c): 600 mm dia piles

Please refer to Para 20.2 **BORED CAST-IN-SITU REINFORCED CONCRETE PILES** from page no.1082 to page no. 1090 of CPWD Specifications Volume II – 2019.

DSR Item No. 20.2A.1 : Boring, providing and installation bored cast-in-situ reinforced cement concrete piles of grade M-25 of specified diameter and length below pile cap, to carry a safe working load not less than specified, excluding the cost of steel reinforcement but including the cost of boring with bentonite solution and temporary casing of appropriate length for setting out and removal of same and the length of the pile to be embedded in the pile cap etc. by Crawler mounted, telescopic boom hydraulic pilling Rig all complete, including removal of excavated earth with all its lifts and leads (length of pile for payment shall be measured up to bottom of pile cap).

Please refer to Para 20.2 BORED CAST-IN-SITU REINFORCED CONCRETE PILES from page no. 1082 to page no. 1090 of CPWD Specifications Volume II – 2019.

DSR Item No. 20.6.1.1 : Vertical load testing of piles in accordance with IS 2911 (Part IV) including installation of loading platform by Kentledge method and preparation of pile head or construction of test cap and dismantling of test cap after test etc. complete as per specification & the direction of Engineer in-charge.

Note: 1. Initial and Routine Load Test shall not be carried out by Dynamic method of testing.
Note: 2. Testing agency shall submit the design of loading platform for the approval of Engineer-in-charge.

(a) : Initial test (Test Load 2.5 times the safe capacity)

DSR Item No. 20.6.1.2: (b): Routine test (Test Load 1.5 times the safe capacity)

DSR Item No. 20.6.2.1: Single pile above 50 tonne and up to 100 tonne capacity

(a.1): Initial test (Test Load 2.5 times the safe capacity)

DSR Item No. 20.6.2.2: (b.1): Routine test (Test Load 1.5 times the safe capacity)

DSR Item no. 20.8.1: Lateral load testing of single pile in accordance with IS Code of practice IS: 2911 (Part IV) for determining safe allowable lateral load on pile: (a): Up to 50 tonne capacity pile

DSR Item no. 20.8.2: (b): Above 50 tonne and up to 100 tonne capacity pile

DSR Item no. 20.9: Integrity testing of Pile using Low Strain/ Sonic Integrity Test/ Sonic Echo Test method in accordance with IS 14893 including surface preparation of pile top by removing soil, mud, dust & chipping lean concrete lumps etc. and use of computerized equipment and high skill trained personal for conducting the test & submission of results, all complete as per direction of Engineer-in-charge.

Please refer to **Para 20.5 LOAD TEST ON PILES** from page no. **1104**to page no. 1107 of CPWD Specifications Volume II – 2019.

SUB HEAD: 2.0
EARTH WORK

Please refer to CPWD Specifications Volume I – 2019 Page No.30 to 58 (with its latest corrections slips up to the date of submission of the Tender.

Contractor shall strictly follow the procedure laid down in the above specifications for Classification of soils, equipment used for earth work in excavation and banking/trench or plinth fillings, transportation of earth and compaction of earth etc. The Earth shall be carried out following relevant safety codes.

Before starting the work at site, the contractor shall take spot levels of entire area of site of work at the interval as directed by Engineer – in – Charge and record the same jointly with the representative of the Engineer – in – Charge. These records of levels will be used for all measurements of Earth work and deciding the various formation levels etc. The rates quoted also include for construction of temporary benchmarks, which shall be retained till the completion of the entire works.

Whenever dewatering is required to be carried out because of rain water accumulated in excavated pits or because of ingress of any sub soil water or from any underground pipes etc. in to the pits, the contractor shall employ necessary pumping to bail out the water and to keep the pits free of water till the activities in that area is complete, without any extra cost.

Earth filled in Trenches, Plinth or in Embankments shall be compacted and compacted manually, or with earth rammers, or with earth compactors or with vibratory rollers, so as to achieve minimum 95% proctor Density of compacted earth at OMC, within the quoted rates of relevant items. Contractor shall also produce Test results for compaction as per frequency specified in relevant Indian standards and as directed by Engineer – in – charge.

Anti-termite treatment carried out for various buildings shall be guaranteed as specified in BOQ or NIT.

ITEM WISE SPECIFICATIONS OF EARTHWORK

DSR Item No. 2.1.1: Earth work in surface excavation not exceeding 30 cm in depth but exceeding 1.5 m in width as well as 10 sqm on plan including disposal of excavated earth up to 50 m and lift up to 1.5 m, disposed soil to be levelled and neatly dressed:

All kinds of soil

1 SURFACE EXCAVATION

Excavations exceeding 1.5 m in width and 10 sqm. on plan but not exceeding 30 cm. in depth in all types of soils and rocks shall be described as surface excavation and shall be done as specified in general specification of earthwork.

2 Measurements

The length and breadth shall be measured with a steel tape correct to the nearest cm. and the area worked out to the nearest two places of decimal in square meters.

3 Rate

Rate shall be as specified in general specification of earthwork.

DSR Item No. 2.6.1

Earth work in excavation by mechanical means (Hydraulic excavator) / manual means over areas up to all depths (exceeding 30 cm in depth, 1.5 m in width as well as 10 Sqm on plan) including getting out and disposal of excavated earth lead upto 2 km and for all lift, as directed by Engineer-in-charge. Disposed material to be spread, leveled, compacted and neatly dressed.

(a) : All kinds of soil

EXCAVATION OVER AREA (ALL KINDS OF SOIL)

1 Thi**s** shall comprise**:**

(a) Excavation exceeding 1.5 m in width and 10 sqm on plan and exceeding 30 cm in depth.

(b) Excavation for basements, water tanks etc.

(c) Excavation in trenches exceeding 1.5 m in width and 10 sqm on plan.

2 Excavation shall be done as specified in general specifications of earthwork.

3 Measurements shall be as specified in general specifications of earthwork.

4 Rates shall be as specified in general specifications of earthwork.

DSR Item no. 2.10.1 : Earth work in excavation by mechanical means (Hydraulic excavator) / manual means in foundation trenches or drains up to any depth (not exceeding 1.5 m in width or 10 Sqm on plan) including dressing of sides and ramming of bottoms, for all lift, including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 2 km. Disposed material to be spread, leveled, compacted and neatly dressed.

i. : All kinds of soil.

(a) : Pipes, cables etc, not exceeding 80 mm dia.

(b) : :Pipes exceeding 80mm dia but not exceeding 300mm dia.

(c) : Pipes, cables etc. exceeding 300 mm dia but not exceeding 600 mm

1 This shall comprise:

(a) Excavation not exceeding 1.5 m in width and 10 sqm on plan.

(b) Excavation for foundation trenches. Etc.

(c) Excavation in trenches not exceeding 1.5 m in width and 10 sqm on plan.

2 Excavation shall be done as specified in general specifications of earthwork.

3 Measurements shall be as specified in general specifications of earthwork.

4 Rates shall be as specified in general specifications of earthwork.

DSR Item No. 2.3.1. : Banking with excavated earth in layers not exceeding 20 cm in depth, breaking clods, watering, rolling each layer with 1/2 tonne roller, or wooden or steel rammers, and rolling every 3rd and top-most layer with power roller of minimum 8 tonnes and dressing up including 2 km lead and lift. Consolidation of Earth to be acheived up to 95% proctor Desnsity of Earth. The mode of measurement will be made on the consolidated volume.

1 Banking Excavated earth shall be done as specified in general specifications of earthwork.

2 Measurements shall be as specified in general specifications of earthwork and measurements of compacted earth compacted to proctor density of 95% at optimum moisture content will be considered for payment.

3 Rates shall be as specified in general specifications of earthwork except that banking excavated earth includes all lead & lift.

DSR Item 25(a) : Excavating, supplying, stacking and filling of good quality local earth (murrum) (including royalty) by mechanical transport upto a lead of 5km also including ramming and watering of the earth in layers not exceeding 20 cm in foundation trenches, plinth, sides of

foundation etc. complete for all lift. Consolidation of Earth to be achieved up to 95% proctor density of Earth. The mode of measurement will be made on the consolidated volume.

1 Earth Filling with Earth brought from outside The Earth for filling shall be brought from approved borrow pits outside the premises of the owner. The rate includes for Excavation of earth (murrum) at borrow pits, Loading in the Transporting trucks/dumpers/ Transporting to site, laying in layers and compaction by mechanical means/earth rammers and/or flooding water. The Consolidation of Earth to be achieved up to 95% proctor Density of Earth. Earth used for filling shall be free from shrubs, rank, vegetation, grass, brushwood, stone shingle and boulders (larger than 75mm in any direction), organic or any other foreign matter. Earth containing deleterious materials, salt peter earth etc. shall not be used for filling. All clods and lumps of earth exceeding 8 cm in any direction shall be broken or removed before the earth is used for filling.

2 Measurements shall be as specified in general specifications of earthwork and measurements of compacted earth compacted to proctor density of 95% at optimum moisture content will be considered for payment.

3 Rates shall be as specified in general specifications of earthwork except that earth filling includes all lead & lift.

DSR Item No. 2.25 : Filling available excavated earth (excluding rock) in trenches, plinth, sides of foundations etc. in layers not exceeding 20cm in depth, consolidating each deposited layer by ramming and watering, including all lead and lift.

FILLING IN TRENCHES, PLINTH, UNDER FLOOR ETC.

1.0 Earth

Normally excavated earth from same area shall be used for filling. Earth used for filling shall be free from shrubs, rank, vegetation, grass, brushwood, stone shingle and boulders (larger than 75mm in any direction), organic or any other foreign matter. Earth containing deleterious materials, salt peter earth etc. shall not be used for filling. All clods and lumps of earth exceeding 8 cm in any direction shall be broken or removed before the earth is used for filling**.**

2.0 Filling

The space around the foundations and drains in trenches shall be cleared of all debris, brick bats etc. The filling shall be done in layers not exceeding 20 cm in depth. Each layer shall be watered, rammed and compacted. Ramming shall be done with iron rammers where possible and with blunt end of crow bars where rammers cannot be used. Special care shall be taken to ensure that no damage is caused to the pipes, drains, masonry or concrete in the trenches.

In case of filling under floor, the finished level of filling shall be kept to the slope intended to be given to the floor.

3.0 Measurements

3.0.1 ***Filling Side of Foundations:*** The cubical contents of bed concrete levelling course and masonry/ concrete in foundations up to the ground level shall be worked out and the same deducted from the cubical contents of earthwork in excavation for foundations already measured under the respective item of earth work to arrive at the quantity for filling sides of foundation. Quantity of Compacted earth shall be measured and paid for. The quantity shall be calculated correct to two places of decimal**.**

3.0.2 ***Filling in Plinth and under Floors:*** Depth of filling shall be the compacted depth. The dimensions of filling shall be on the basis of pre-measurement correct to the nearest cm and cubical content worked out in cubic meters correct to two places of decimal.

4.0 Rates

The rates include cost of all the operations described above.

DSR Item No. 2.27: Supplying and filling in plinth with Clean Coarse sand under floors, including watering, ramming, compacting and dressing complete.

SAND FILLING IN PLINTH

1.0 Sand

Clean Coarse Sand as approved by Engineer –in – Charge and available in the area shall be free from dust organic and foreign matter and its grading shall be within the limits of grading zone IV or V**.**

2.0 Filling

Sand filling shall be done in a manner similar to earth filling in plinth specified above except that compaction shall be done by flooding with water. The surface of the compacted sand filling shall be dressed to the required level or slope and shall not be covered till the Engineer-in-Charge has inspected and approved the sand filling.

3.0 Measurements

The length, breadth and depth of compacted sand shall be measured correct to the nearest cm and cubical contents after compaction shall be worked out in cubic meters correct to two places of decimal.

4.0 Rates

The rates include the cost of material and labour involved in all the operations described above in general specifications of earthwork.

DSR Item No. 1.1.2: Disposal of excavated surplus excavated unusable stuff/earth from the site by Mechanical transport including loading, transporting and unloading to approved locatin for all lead and for all lifts complete as per direction of Engineer-in-Charge.

This item will operated for disposal of Earth up to any lead the case may be, beyond the initial lead mentioned in relevant items of Excavation. The same item shall also be operated for the disposal of other debries like dismentaled materials etc. The Place of disposal shall be approved beforehand by the Engineer – in – Charge. The carriage and stacking of materials shall be done as directed by the Engineer-in-Charge. Any tools and plants, required for the work shall be arranged by the Contractor.

01.2 MODE OF CARRIAGE

Depending upon the feasibility and economy, the Engineer-in-Charge shall determine the mode of carriage viz. whether by mechanical or animal transport or manual labor.

01.3 LEAD

01.3.1 All distances shall be measured over the shortest practical route and not necessarily the route actually taken. Route other than shortest practical route may be considered in cases of unavoidable circumstances and as approved by Engineer-in-Charge along with reasons in writing.

01.3.3 Carriage by animal and mechanical transport shall be reckoned in one km unit. Distances of 0.5 km or more shall be taken as 1 km and distance of less than 0.5 km shall be ignored. However, when the total lead is less than 0.5 km, it will not be ignored but paid for separately in successive stages of 50 meters subject to the condition that the rate worked on this basis does not exceed the rate for initial lead of 1 km by mechanical/ animal transport.

DSR Item No. 2.31 : Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth up to 30 cm measured at a height of 1m above ground level and removal of rubbish upto a distance of 50 m outside the periphery of the area cleared.

JUNGLE CLEARANCE

Jungle clearance shall comprise uprooting of rank vegetation, grass, brushwood, shrubs, stumps, trees and saplings of girth up to 30 cm measured at a height of one meter above the ground level. Where only clearance of grass is involved it shall be measured and paid for separately**.**

1 Uprooting of Vegetation

The roots of trees and saplings shall be removed to a depth of 60 cm below ground level or 30 cm below formation level or 15 cm below sub-grade level, whichever is lower. All holes or hollows formed due to removal of roots shall be filled up with earth rammed and levelled. Trees, shrubs, poles, fences, signs, monuments, pipe lines, cable etc., within or adjacent to the area which are not required to be disturbed during jungle clearance shall be properly protected by the contractor at his own cost and nothing extra shall be payable.

2 Stacking and Disposal

All useful materials obtained from clearing and grubbing operation shall be stacked in the manner as directed by the Engineer-in-Charge. Trunks and branches of trees shall be cleared of limbs and tops and stacked neatly at places indicated by the Engineer-in-Charge. The materials shall be the property of the Government. All unserviceable materials which in the opinion of the Engineer-in-Charge cannot be used or auctioned shall be removed up to any distance outside the periphery of the area under clearance. It shall be ensured by the contractor that unserviceable materials are disposed of in such a manner that there is no likelihood of getting mixed up with the materials meant for construction.

3 Clearance of Grass

Clearing and grubbing operation involving only the clearance of grass shall be measured and paid for separately and shall include removal of rubbish up to any distance outside the periphery of the area under clearance**.**

4 Measurements

The length and breadth shall be measured correct to the nearest cm and area worked out in square meters correct to two places of decimal.

5 Rates

The rate includes cost of all the operation described above.

DSR Item No. 2.33.1: Felling trees of the girth (measured at a height of 1 m above ground level), including cutting of trunks and branches, removing the roots and stacking of serviceable material and disposal of unserviceable material.

(a): Beyond 30 cm girth up to and including 60 cm girth

DSR Item No. 2.33.2: (b): Beyond 60 cm girth up to and including 120 cm girth

DSR Item No. 2.33.3: (c): Beyond 120 cm girth up to and including 240 cm girth

DSR Item No. 2.33.4: (d): Above 240 cm girth

1 Felling

While clearing jungle, growth trees above 30 cm girth (measured at a height of one meter above ground level) to be cut, shall be approved by the Engineer-in-Charge and then marked at site. Felling trees shall include taking out roots up to 60 cm below ground level or 30 cm below formation level or 15 cm below sub-grade level, whichever is lower.

All excavation below general ground level arising out of the removal of trees, stumps etc. shall be filled with suitable material in 20 cm layers and compacted thoroughly so that the surfaces at these points conform to the surrounding area. The trunks and branches of trees shall be cleared of limbs and tops and cut into suitable pieces as directed by the Engineer-in-Charge.

2 Stacking and Disposal

Wood, branches, twigs of trees and other useful material shall be the property of the Government. The serviceable materials shall be stacked in the manner as directed by the Engineer-in-Charge up to any distance.

All unserviceable material, which in the opinion of Engineer-in-Charge cannot be used or auctioned shall be removed from the area and disposed of as per the directions of the Engineer-in-Charge. Care shall be taken to see that unsuitable waste materials are disposed of in such a manner that there is no likelihood of these getting mixed up with the materials meant for construction.

3 Measurements

Cutting of trees above 30 cm in girth (measured at a height of one meter above level) shall be measured in numbers according to the sizes given below:

(a) Beyond 30 cm girth, up to and including 60cm girth.
(b) Beyond 60 cm girth, up to and including 120 cm girth.
(c) Beyond 120 cm girth, up to and including 240 cm girth.
(d) Above 240 cm girth.

DSR RA -1: Providing and injecting Chemical emulsion for PRE - CONSTRUCTIONAL anti-termite treatment and creating a chemical barrier to floor, bottom, sides of the foundations, earth fills, coping, etc including spraying the chemical solution in oil base at the rate of 5 litres per m2 for walls and 7.5 litres per sqm for plinth area (Horizontal surfaces), over doors, windows, vents, walls, junction boxes, conduits, outside earth fill surrounding the building consistent with latest updated IS - 6313(Part-I-III) as directed by Engineer in charge. The work shall be carried out by approved applicator in termite/pest control treatment to the

manufacturer's specifications subject to minimum specifications described under "Earth Work" in preamble and in technical specifications. A guarantee bond of 10 years shall be furnished in prescribed proforma. Rate shall be inclusive of material required for Anti Termite Treatment and labour and equipment's required for applying in any condition all etc. complete as directed by engineer in charge. (Stage of treatment may be vary as per site condition. Contractor shall be approved by Engineer in charge before execution.)
Only plinth area of the treated building at ground level excluding open to sky area such as courts, shaft, etc and porches shall be measured for payment.

1. **Treatment :** Anti termite chemical Chlorpyriphos 20EC in 1% concentrations solution or equivalent shall be used for this treatment. The treatment shall be carried out as per IS 6313-2 (2001): Code of Practice for Anti-Termite Measures in Buildings, Part 2: Pre-constructional Chemical Treatment Measures [CED 13: Building Construction Practices including Painting, Varnishing and Allied Finishing] Pre construction Anti termite treatment shall be carried out at 3 stages.

- Below the PCC of the wall/column foundation and up to 30 cm. height on the sides of excavation from the bottom of foundation trench.
- Below the floor PCC by making 30 cm deep holes in the earth and spraying Anti Termite chemicals at the rates shown in item description and also filling the holes with chemicals.
- The external sides of the wall periphery of the building shall be treated at Formation ground level before constructing plinth protection/external finishing.

4 Measurements

Area of the plinth in plan shall be measured in Sqm. and paid for.

5 Rates

The rate includes cost of all the operation described above.

DSR RA 2 Providing and Laying Separation Membrane of impermeable plastic sheeting 125 micron thick.

1. **Materials and Laying**: Seperation Membrane shall be a Plastic sheet of 125 micron thickness. It shall be laid between the subgrade/earth filling in plinth or in Roads before laying the PCC/DLC. The Plastic sheets shall be laid with a minimum of 150 mm at the joints.

2. **Measurements:** The area of sheet laid shall be measured in Sqm. No separate measurements for Overlap shall be considered.

DSR RA -3 Providing & Laying barricading with Pre-coated G.I. profile Sheets bolted with MS 50x50 mm square light weight pipe spaced 1.0 meter centre to centre. The MS 50x 50 mm light weight pipe welded with MS 75x75 light weight pipe spaced 5.0 meter centre to centre which will be embedded in mobile iron pedestal rings suitably framed for giving stable support as per direction of the Engineer-in-charge. All management (including watch and ward) of barricades shall be the full responsibility of the contractor. The barricades shall be removed only after completion of the work or part of the work. After completion of work barricading will be contractor's property.

1. **Materials :** 50 mm x 50 mm Square Light weigh M.S. Pipes shall be fixed horizontally at 1 m spacing. 75 mm x 75 mm square M.S. vertical pipes shall be fixed in ground with PCC at 5.0 spacing, Horizontal pipes shall be welded or bolted to the vertical pipes. Colour coated G.I. Profile sheets of approved shade and minimum thickness 0.5 mm shall be fixed to the M.S. Pipes frames to form a barricade. Space of 10 cm. shall be kept between two sheets to allow the passage of wind.
   Materials used in the Barricade will be the property of the contractor and he shall take back them at the end of the project.

2. **Measurements:** Barricade shall be measured in area of the barricade in Sqm.

DSR Horticulture 12.1.1 "Transplantation of trees with in a distance of 2km including excavation around existing tree, pruning of branches, lifting, loading and transportation of existing tree, digging pits for placing tree at new place, adding manure, sand, fertilizer, hormones and bio fertilizer to it. Levelled and neatly dressed and disposal of surplus materials from old existing and new sites to designated place. Each tree should be firmly secured to the stake so as to prevent excessive movement, flooding with water, treatment of roots, rope and gunny bags as per direction of the officer incharge. T&P and all required materials shall be arranged by the contractor and nothing extra shall be paid on this account. Girth of tree shall be measured at a height of 1m above ground level."

a) **Girth of trees upto 50cm.**
b) **Girth of trees beyond 50cm and upto 90cm**

1. The above items are pertaining to the trees which are obstructing the construction of the building and needs to be transported and transplanted at other suitable location instead of cutting them. The Specifications for these items are enumerated in DSR for Horticulture works.
2. **Measurements** : Measurements shall be in number of trees Transplanted.

SUB HEAD: 3.0
CONCRETE WORK

Please refer to Relevant Paras for Concrete Work of CPWD Specifications Volume I – 2019 Page No.83 to 111 (with its latest corrections slips up to the date of submission of the Tender.

Contractor shall strictly follow the procedure laid down in the above specifications for quality of Materials like cement, aggregates, sand, water and concrete admixtures if any, Equipment to be used, procedures for Mixing and Placing of Concrete, curing of concrete etc. and Testing of Fresh concrete and concrete after it has set.

Contractor shall establish full-fledged testing laboratory equipped with all necessary testing instruments, at site as directed by Engineer – in – Charge. Contractor shall also be responsible to produce the results of testing as specified in these specifications and as per relevant Indian Standards at specified frequency.

ITEM WISE SPECIFICATIONS OF CONCRETE WORK

DSR Item No. 4.20.1 1. :
Providing and laying in position ready mixed or site batched design mix cement concrete for plain cement concrete work; using coarse aggregate and fine aggregate derived from natural sources, Portland Pozzolana/Ordinary Portland /Portland Slag cement, admixtures in recommended proportions as per IS: 9103 to accelerate / retard setting of concrete, to improve durability and workability without impairing strength; including pumping of concrete to site of laying, curing, carriage for all leads; but excluding the cost of centering, shuttering and finishing as per direction of the engineer-in-charge; for the following grades of concrete.
Note: Extra cement up to 10% of the minimum specified cement content in design mix shall be payable separately. In case the cement content in design mix is more than 110% of the minimum specified cement content, the contractor shall have discretion to either re-design the mix or bear the cost of extra cement.
All works up to plinth level :
Concrete of M10 grade with minimum cement content of 220 kg /cum

DSR Item No. 4.20.1.2: Concrete of M15 grade with minimum cement content of 240 kg /cum
DSR Item No. 4.20.1.3: (d): Concrete of M20 grade with minimum cement content of 270 kg /cum
1.0 MATERIAL
Water, cement, fine aggregate or sand, surkhi, and fly ash, coarse aggregates shall be as specified in detailed specifications of Concrete works.

2.0 Proportions:
Concrete shall be classified by different proportions of Cement: Fine aggregate: Coarse Aggregate as per respective Design Mix Minimum cement content for different design mix shall be as per individual mix.

3.0 The measurements shall be in Cum.

4.0 The rates shall include all the cost of all materials, labour for all operations of mixing, placing, finishing and curing of concrete and all the equipment required for the work.

SUB HEAD: 4.0
REINFORCED CEMENT CONCRETE WORK

Please refer to Relevant Paras for Reinforced Cement Concrete Work of CPWD Specifications Volume I – 2019 Page No.115 to 226 (with its latest corrections slips up to the date of submission of the Tender.

Contractor shall strictly follow the procedure laid down in the above specifications for quality of Materials like cement, aggregates, sand, water and concrete admixtures if any, Equipment to be used, procedures for Mixing, transporting and Placing of Concrete at desired location, curing of concrete etc. and Testing of Fresh concrete and concrete after it has set.

All Concrete to be used for Reinforced Cement concrete will be of Designed mix only. The rates include for using minimum quantity of cement as specified for relevant design mix and use of Concrete admixture to achieve desired workability for the concrete.

Contractor shall establish full-fledged testing laboratory equipped with all necessary testing instruments, at site as directed by Engineer – in – Charge. Contractor shall also be responsible to produce the results of testing as specified in these specifications and as per relevant Indian Standards at specified frequency.

Contractor shall provide necessary scaffolding, Centering and Form work of approved quality and adequate strength (for all kinds of work like beams, slabs, columns, walls etc. as the case may be) as required as per detailed drawings and as directed by Engineer – in – Charge. The rates include for designing of form work required for special shapes as detailed and making all necessary safety arrangements as per relevant safety codes. Good quality, non-staining type form oil shall be applied to all forms before they are erected. Care shall be taken that any oil does not stick to reinforcement bars.

The Reinforcement work includes, cutting, bending, placing and binding of reinforcement of approved quality as per detailed drawings and as directed by the Engineer – in – Charge. Approve quality of reinforcement couplers shall be used as and when directed. Necessary testing of Reinforcement as

per relevant Indian Standards will have to be carried out at specified frequency /within the quoted rates.

ITEM WISE SPECIFICATIONS FOR REINFORCED CEMENT CONCRETE WORK

DSR Item No. 5.9.1: Centering and shuttering including strutting, propping etc. and removal of form for

(a) : Foundations, footings, bases of columns, etc. for mass concrete

DSR Item No. 5.9.2: (b): Walls (any thickness) including attached pilasters, buttresses, plinth and string courses & kerb etc.
DSR Item No. 5.9.3: (c): Suspended floors, roofs, landings, balconies and access platform including edges
DSR Item No. 5.9.4: (d): Shelves (Cast in situ)
DSR Item No. 5.9.5: (e): Lintels, beams, plinth beams, girders, resumes and cantilevers
DSR Item No. 5.9.6: (f): Columns, Pillars, Piers, Abutments, Posts and Struts
DSR Item no. 5.9.7: (g): Stairs, (excluding landings) except spiral-staircases
DSR Item No. 5.9.9: (h): Arches, domes, vaults up to 6 m span.
DSR Item No. 5.9.14: (i): Extra for shuttering in circular work.
DSR Item No.5.9.15 : (j) : Small lintels not exceeding 1.5 m clear span, molding as in cornices, window sills, string courses, bands, copings, bed plates, anchor blocks and the like.
DSR Item No. 5.9.19: (k): Weather shade, chajjas, corbels etc., including edges.
DSR RA (4) : Waffle slabs with intermediate rib beams with FRP molding

DSR RA (5) : Extra for Shuttering in sloping slabs for chhatries, gopurams, etc. including the edge beams etc. at all levels.

DSR Item no. 5.1.1 : Extra for false staging for additional height in centering, shuttering where ever required with adequate bracing, propping etc., including cost of de-shuttering and decentering at all levels over a height of 3.5 m, for every additional height of 3.5 m or part thereof for Suspended roofs, sloping slabs, slabs in curved shape, landing, beams and balconies etc. (only plan area of staging to be measured and paid for. Staging for vertical walls, columns pardies etc. will not be paid for in any case.)

1 Form Work

The form work should be as per mentioned in 5.2.1 of CPWD specifications of Reinforced Cement Concrete work. For Additional items of Shuttering and formwork, the following is to be followed.

- Form work for Waffle slab shall be done with FRP molding as required by the Architectural Design. Necessary supporting system and centring to be provided.
- False Staging for form work for height from corresponding floor level/supporting level shall be designed to take care of additional dead loads of form work. Sufficient bracing to be provided at a spacing of not more than 1.5/2.0 m on the entire height of the props. Adequate cross bracing also to be provided.

2 Design & Tolerance in Construction

The form work should be as per mentioned in 5.2.2 of CPWD specifications of Reinforced Cement Concrete work.

3 General Requirement

The form work should be as per mentioned in 5.2.3 of CPWD specifications of Reinforced Cement Concrete work.

4 Surface Treatment

The form work should be as per mentioned in 5.2.4 of CPWD specifications of Reinforced Cement Concrete work.

5 Inspection of Form Work

The form work should be as per mentioned in 5.2.5 of CPWD specifications of Reinforced Cement Concrete work.

6 Measurements

The form work should be measured as the surface area of form work in contact of Concrete and as mentioned in detail in 5.2.6 of CPWD specifications of Reinforced Cement Concrete work.

7 Rate

The form work should be as per mentioned in 5.2.7 of CPWD specifications of Reinforced Cement Concrete work.

DSR Item No. 5.22.6: Steel reinforcement for R.C.C. work including straightening, cutting, bending, placing in position and binding all complete up to plinth level. Thermo-Mechanically Treated bars TMT 500 D

DSR Item No. 5.22A.6: Steel reinforcement for R.C.C. work including straightening, cutting, bending, placing in position and binding all complete above plinth level. Thermo-Mechanically Treated bars TMT 500 D

1 General Requirements

The general requirements of Item No. 5.22 should be as mentioned in 5.3.1 of general specifications of Reinforced Cement Concrete Works. The for work up to plinth level and the work above plinth level shall be paid under separate items.

2 Welding of Bars

The Welding of bars should be as mentioned in 5.3.2 of general specifications of Reinforced Cement Concrete Works.

3 Placing in Position

The Positioning of steel should be as mentioned in 5.3.3 of general specifications of Reinforced Cement Concrete Works.

4 Measurement

The measurements should be as mentioned in 5.3.4 of general specifications of Reinforced Cement Concrete Works.

5 Rate

The rates should be as mentioned above in 5.3.5 of general specifications of Reinforced Cement Concrete Works.

DSR Item No. 5.33.1 :

Providing and laying in position concrete manufactured in fully automatic batching plant and transported to site of work in transit mixer for all leads, having continuous agitated mixer, or machine batched and machine mixed at site, design mix cement concrete for reinforced cement concrete work, using cement content as per approved design mix, including pumping of concrete to site of laying but excluding the cost of centering, shuttering, finishing and reinforcement, including admixtures in recommended proportions as per IS: 9103 to accelerate, retard setting of concrete, improve workability without impairing strength and durability as per direction of Engineer-in-charge. (Note :- Minimum Cement content considered in this item is @ 330 kg/cum.

(a) : All works upto plinth levelDSR Item No. 5.33.1.1 : Concrete of M25 grade with minimum cement content of 330 kg /cum

DSR Item No. 5.33.1.2: Concrete of M30 grade with minimum cement content of 350 kg /cum

DSR Item No. 5.33.2: (b): All works above plinth level up to Floor V level.

DSR Item No. 5.33.2.1 : Concrete of M25 grade with minimum cement content of 330 kg /cum

DSR Item No. 5.33.2.2: Concrete of M30 grade with minimum cement

content of 350 kg /cum

Refer following section - Para 5.4 Page 145 to 155 for Nominal Mix, Para 5.8 on Page 166 to 175 for Design Mix concrete, Para 5.9 on Page 175 to Page 183 for Ready Mix Concrete and Para 5.10 on Page 183 to page 185 for Placing of concrete of CPWD Specifications for Reinforced Cement Concrete work .

A CONCRETING

1 Consistency
2 Placing of Concrete
3 Compaction
4 Construction joints
5 Expansion Joints
6 Curing
7 Finishing
8 Strength of Concrete
9 Testing of Concrete
10 Standard of Acceptance – for Nominal Mix
11 Measurements
12 Tolerances
13 Rate

Para 5.8 DESIGN MIX

Definition
1 Mix Design and Proportioning
2 Standard Deviation
3 Acceptance Criteria
4 Cement Content of Concrete
5 Water cement Ratio and slump
6 Approval of Design Mix

C READY MIXED CONCRETE (as per IS 4926)

1 Materials
2 General Requirements
3 Sampling and Testing of Ready-Mixed Concrete
4 Information to be supplied by the Purchaser
5 Information to be supplied by the Producer
6 Production and Delivery
7 Quality Control
8 Order Processing
9 Records

D PLACING CONCRETE BY PUMPING

1 General

2 Pumping Equipment's

Market Rate Item no. (6) : Extra Labour for leaving hollow spaces in Burnt brick Masonry/CSE block masonry for RCC Vertical mullians & horizontal transoms (ties) of required size, providing reinforcement bar for mullians & transoms (ties) as per structural drawing corners bars and concreting the same with M25 concrete grade concrete including removal of mortar, dust, etc. from the hollow spaces before doing the concreting complete as per drawing & instruction of engineer- in- charge. Reinforcement concrete & Burnt brick Masonry/CSE block masonry will be paid separately in their respective items.

Measurements

The above mentioned item shall be measured in cum.

DSR Item No. 5.42.1 : Providing and fixing tapered / parallel threaded couplers conforming to IS code on "Reinforcement Couplers for Mechanical Splices of Bars for Concrete Reinforcement - Specification", to reinforcement bars including threading, enlargement at connection by forging, protecting the prepared reinforcement bars and related operations as required to complete the works per direction of Engineer-in-Charge. (The length of the bars in which coupler is to be provided should not be less than 4 meter, no deduction for labour and binding wire saved for not providing lap length shall be made).
(a): Coupler for 16 mm diameter reinforcement bar
DSR Item No. 5.42.2: (b): Coupler for 20 mm diameter reinforcement bar

1. **Material**

This item comprising of Providing and fixing tapered / parallel threaded couplers conforming to IS code on "Reinforcement Couplers for Mechanical Splices of Bars for Concrete Reinforcement - Specification", to reinforcement bars including threading, enlargement at connection by forging, protecting the prepared reinforcement bars and related operations as required to complete the works per direction of Engineer-in-Charge. (The length of the bars in which coupler is to be provided should not be less than 4 meter, no deduction for labour and binding wire saved for not providing lap length shall be made). Please refer CPWD Specifications Vol.1 item no. 5.3 on page 145.

2. Measurements:

Couplers shall be measured in unit of Numbers.

3.Rate

The rate shall include the cost of material supply of labour, tools, adhesive material fixing and equipment required for placing.

Market Rate Item no. (7): Providing and laying polysulphide sealant for expansion joints of approved make Including surface preparation, applying primer, backer rod, sealant, curing make as per drawing, manufacturer specification to give water tightness & as directed by engineer in charge.

1 Material Description
It must meet the Specification requirement of BS 4254 – 1983.
.
Joint Design

Joint Width (mm) Width/ Depth Ratio
For 25 to 50 mm joint width Depth shall be half or less than half

2 Method of Application
Surface Preparation
Joint edges should be sound and free from grease or oil contaminations. If spalled, it should be rectified properly by using polymer mortar or epoxy mortar. Fix a bond breaker tape over the backup material to prevent third surface adhesion. Fix a masking tape on both sides of joint surface to get neat & clean appearance of joints after application of sealant.
Priming

Prime only on two sides of the properly prepared joint surface with approved primer and allow it to dry for minimum 20 minutes. Apply two coats of primer at an interval of 30 minutes. After priming is over, sealants should be filled after 30 minutes and before 90 minutes. If 90 minutes is exceeded a fresh coat of primer should be applied.

Mixing
Mix the content of the individual container thoroughly.
The curing agent is to be poured in the tin with the base and mixed thoroughly with a slow speed electric mixer (300 to 450 rpm) for approx. 5-6 minutes until a homogeneous and uniformly grey coloured material is obtained.

Sealant Application

After mixing fill the sealant in the joint using spatula. First, apply the sealant at both the bottom corners till top then fill in the center and level it off. Sealant filled cartridge to be inserted in to a hand-operated gun. By applying nominal hand pressure sealant can be extruded and filled in the joint.

Finishing

Tool sealant immediately with tooling knife to ensure 100% contact and adhesion with the surface. Finishing need to be done by using soap solution (around 5% concentrated) by tooling sealant surface with soap solution wetted finger.

Cleaning

After sealing the joint the tools and equipment's should be cleaned immediately with kerosene or any other cleaning solvents/thinners.

3 Mode of Measurement
The rate shall be for a unit of one running meter.
The area where overlap is supposed to be required will not be paid for separately.

4 Rate
Rate shall include the primer & sealant cost of all the materials and labour involved in all the operations described above except otherwise stated.

Market Rate Item no. (8): Providing and wet drilling accurate and clean holes of specified diameter in RCC walls, slabs, beam or any other RCC member without vibration by core cutting (diamond drilling) machine of approved make for laying service lines including scaffolding, safety majors, disposing the debris, cleaning, making good, providing epoxy mortar/ micro concrete/ patch repair mortar/ Non shrink grout for concrete for grouting the gaps around the pipes for all levels/ all height, after approval of engineer in charge etc compete. Measurement shall be taken for the depth of holes in running meter for specified diameter. Holes shall made by authorized approved agency. Scanning of reinforcement shall be carried out before core cutting if required and as suggested by Engineer in charge. Location of core cutting shall be approved by Engineer in charge.

a) Up to 52 mm dia

Market Rate Item no. (9) : b) Beyond 52mm dia up to 77 mm dia
Market Rate Item no. (10): c) Beyond 77mm dia up to 102 mm dia
Market Rate Item no. (11): c) Beyond 102mm dia up to 163 mm dia

The item comprising drilling holes/cores of 50 to 163 mm diameter in RCC slab/wall/beam for drainage line fittings as per drawing and as directed by engineer in charge.
Care shall be taken when cutting in RCC slab/wall/beam that any structure component shall not be damaged anywhere, if damaged then structure component shall be repaired as directed by engineer in charge and nothing extra shall be paid for the repairing work.
Scanning of reinforcement shall be carried out before drilling the hole to ascertain that reinforcement bars do not get cut while Drilling. Location of core cutting shall have to be approved by Engineer In Charge before drilling.

Mode of Measurement
The rate shall be for a unit of Rmt for each individual diameter range of drilling holes.

Core Cutting will be paid for making the holes only other than the holes drilled for fixing of plumbing and drainage lines. For Core cutting holes made for fixing Plumbing and drainage lines shall be deemed to be included in the respective items of providing, laying and fixing of Plumbing pipes.

Rate
The rate shall be include the cost of all the materials and labour involved in all the operations described above except otherwise stated.

SUB HEAD: 5.0
BRICK WORK

Please refer to Relevant Paras for Brick Work of CPWD Specifications Volume I – 2019 Page No.227 to 268 (with its latest corrections slips up to the date of submission of the Tender.

Contractor shall strictly follow the procedure laid down in the above specifications for quality of Materials like cement, sand, Bricks, water etc., scaffolding, Brick Masonry bonds, curing of works etc. and Testing of Materials etc.

ITEM WISE SPECIFICATIONS FOR BRICK WORK

DSR Item No. 6.1.2 : Brick work with common burnt clay F.P.S. (non modular) bricks of 230 mm x 110 mm x 70 mm class designation 7.5 in foundation and plinth in: Cement mortar 1:6 (1 cement : 6 coarse sand)

Refer following sections List of Mandatory tests Page 231, Para 6.0 page 234 to 235 Para 6.1 Page 235 to 239 , and Para 6.2 on Page 241 to page 245 of CPWD Specifications for Brick work.

Refer BRICKS/BRICK TILES/BRICK BATS/MECHANIZED AUTOCLAVE FLY ASH LIME BRICK

1.0 Material

Bricks used in the masonry may be of the following type.

(a) The Common ***Burnt Clay***

1.1 Dimensions

1.2 Classification

1.3 Sampling and Tests

1.5 Burnt Clay Perforated Building Bricks

1.5.1 *General Quality:*

1.5.2 *Dimensions and Tolerances:*

1.5.3 *Perforations*

1.5.4 *Compressive Strength:*

1.5.5 *Water Absorption:*

1.5.6 *Efflorescence*

1.5.7 *Warpage:*

2 BRICK WORK

2.1 Classification

2.2 Mortar

2.3 Soaking of Bricks

2.4 Laying

2.5 Joints

2.6 Curing

2.7 Scaffolding

2.8 Measurements

2.9 Rate

DSR Item No. 6.4.2 : Brick work with common burnt clay F.P.S. (non modular) bricks of size 230mm x 110mm x 70mm class designation 7.5 in superstructure above plinth level up to floor V level in all shapes and sizes in : Cement mortar 1:6 (1 cement : 6 coarse sand)

The relevant specification shall be as per the above item of brickwork except that the work is to be done in superstructure above plinth level for all levels in all shapes and sizes.

DSR Item No. 6.13.2 : Half brick masonry with common burnt clay F.P.S. (non modular) bricks of class designation 7.5 in superstructure above plinth level up to floor V level in Cement mortar 1:4 (1 cement :4 coarse sand)

HALF BRICK WORK

Brick work in half brick walls shall be done in the same manner as described above in brickwork except that the bricks shall be laid in stretcher bond.

The mortar interposed between the reinforcement bars and the brick shall not be less than 5 mm. The mortar covering in the direction of joints shall not be less than 15 mm. Refer para 6.4 on page 247.

1 Measurements

The length and height of the wall shall be measured correct to a cm. The area shall be calculated in sq.m. where half brick wall is joined to the main walls of one brick or greater thickness and measurements for half brick wall shall be taken for its clear length from the face of the thicker wall.

2 Rate

The rate includes the cost of the materials and labour involved in all the operations described above.

DSR Item No. 6.23 : Honey-comb brick work 10 / 11.4 cm thick with common burnt clay bricks of class designation 7.5 in super structure above plinth level up to floor V level in cement mortar 1:4 (1 cement : 4 coarse sand).

The honeycomb brick work shall be done with specified class of brick, laid in specified mortar. All joints and edges shall be struck flush to give an even surface. The thickness of the brick honeycomb work shall be as specified in drawing. Openings shall be as specified in drawing. Refer para 6.6 on page 247 of CPWD specification Volume 1.

The length and height shall be measured correct to a cm. Area shall be calculated in square meters correct to two places of decimal. Honeycomb openings shall not be deducted. The rate includes the cost of all materials, equipment, labour, carting, loading & unloading, removal of debris to local specified within the site, involved in all the operations described above.

DSR Item No. 6.44 : Brick edging 7cm wide 11.4 cm deep to plinth protection with common burnt clay F.P.S. (non modular) bricks of class designation 7.5 including grouting with cement mortar 1:4 (1 cement : 4 fine sand).

Refer following sections - Para 6.13 Page 252, of CPWD Specifications for Brick work.

1 Bricks
2 Mortar
3 Base Concrete
4 Soaking of Bricks
5 Laying
6 Joints
7 Curing
8 Dry Brick Flooring
9 Measurements
10 Rate

Market Rate Item RA (12): Extra rates over MR item no. 6.4.2 AND 6.13.2 for providing exposed masonry work for Brick masonry with common burnt clay bricks of size 230 mm x 110 mm x 50 mm instead of size 230 mm x 110 mm x 70 mm, including raking horizontal and vertical joints 10 mm wide 12 mm deep to receive pointing complete in cement mortar 1:4 (1 cement: 4 coarse sand). The Exposed surface area only of the Brick work will be measured for payment.

1.1 Facing Bricks
The general specifications for Brick masonry shall be followed. Exposed Brick masonry work is to be carried out according to English bond for particular walls as per detailed drawings. The bricks used for exposed brick masonry shall be selected from the stakes of normal burnt clay bricks. The selected bricks shall have clean edges and the exposed face of the brick shall have even surface without any corner broken during handling. The facing bricks shall be free from cracks, flaws, nodules of free lime warpage and organic matter. These shall be thoroughly burnt and shall have plane rectangular faces with parallel sides and sharp straight right angled edges. Facing bricks shall have uniform colour and even texture. The thickness of joints shall be maintained to give an architectural exposed brick work finish. Joints

to be racked out with wooden Patti up to uniform depth of 10 mm. Excessive Mortar from Surface of brick masonry should be cleaned with wire brush / good quality broom. Brick masonry to be cured with clean potable water as per clause no. 5.3 above.

Measurements:
Surface area of the exposed area of masonry will be measured and paid for.

DSR Item No. 6.38 : Providing and laying autoclaved aerated cement blocks masonry with 100 mm thick AAC blocks in super structure above plinth level up to floor V level in cement mortar 1:4 (1 cement : 4 coarse sand). The rate includes providing and placing in position 2 Nos 6 mm dia M.S. bars at every third course of masonry work.

DSR Item No. 6.5 : Extra for brick work / AAC block masonry / Tile brick masonry in superstructure above floor V level, for each four floors or part thereof by mechanical means.

DSR Item No. 6.14: Extra for half brick masonry in superstructure, above floor V level for every four floors or part thereof by mechanical means.

Market Rate RA (13) : Extra for taking out brick in pattern at parapet level(Alternate header brick projection by 65mm)

Specifications are generally as per the items of brick work. The work of parapet is to carried out for parapet walls of terraces and balconies. Alternate header brick in each layer is to be projected outside the surface of the brick masonry on external side to create a pattern as per detailed drawings and as per the instructions of Engineer in Charge. The project of header brick shall be minimum 65 mm to 75 mm.

Measurements : Surface Area of parapet wall on external side shall be measured in. Sqm.

Rates : Rates shall be per sqm.

SUB HEAD: 6.0
STONE WORK

Please refer to Relevant Paras for Stone Work of CPWD Specifications Volume I – 2019 Page No.270 to page 300 (with its latest corrections slips up to the date of submission of the Tender.

Contractor shall strictly follow the procedure laid down in the above specifications for quality of Materials like cement, sand, various types of stones, water etc., scaffolding, laying of stone in Masonry, flooring , cladding etc., curing of works and Testing of Materials etc.

ITEM WISE SPECIFICATIONS FOR STONE WORK

DSR Item No. 7.32.1: Stone work, plain in copings, cornices, string courses and plinth courses, up to 75 mm thick in Cement mortar 1:6 (1 cement : 6 coarse sand), including pointing with white cement mortar 1:2 (1 white cement : 2 stone dust) with an admixture of pigment matching the stone shade. - Red Sandstone

Refer para 7.0 on page 276 to page 278, and 7.9 on page 290 of CPWD specifications Volume 1.
Measurements shall be in cum. Of the stone member.

MR Item RA (14) : GRC jali
Providing & fixing glass-fibre reinforced concrete jali of required size and of minimum 40 mm thickness as approved by the architect and/or Engineer - in Chrage complete as per the manufacturer's specification at all height, all floors and at all levels.

Glass Fiber Reinforced Concrete Jali consists of high-strength concrete reinforced with glass fibers, making it stronger and lighter than standard precast concrete. The term "Jali" traditionally refers to intricate, mesh-like patterns found in Indian and Islamic architecture, historically carved from stone or wood. The design of jail shall be as per detailed Architectural requirements.
GRC jail shall be lighter in weight compared to Concrete jail. It shall be highly durable and resistant to UV rays, rain, and extreme temperatures, making it ideal for both interior and exterior use. Thickness of GRC Jali shall be 40 mm.

Measurements of Jali shall be the area of opening where the jail is fixed and shall be in square meter.

SUB HEAD: 7.0
MARBLE & GRANITE WORK

Please refer to Relevant Paras for Cladding work (for the properties of Stone Work) of CPWD Specifications Volume I – 2019 Page No.303 to 342 (with its latest corrections slips up to the date of submission of the Tender.

Contractor shall strictly follow the procedure laid down in the above specifications for quality of Materials like cement, sand, Granite stones, water etc., scaffolding, laying of Granite stone in flooring, Skirting, platforms cladding etc., curing of works and Testing of Materials etc.

ITEM WISE SPECIFICATIONS FOR GRANITE WORK

DSR Item No. 8.2.2.2 : Providing and fixing 18 mm thick gang saw cut, mirror polished, premoulded and prepolished, machine cut for kitchen platforms, vanity counters, window sills , facias and similar locations of required size, approved shade, colour and texture laid over 20 mm thick base cement mortar 1:4 (1 cement : 4 coarse sand), joints treated with white cement, mixed with matching pigment epoxy touch ups, including rubbing, curing, moulding and polishing to edges to give high gloss finish etc. complete at all levels.
(a): Granite of any colour and shade Area of slab over 0.50 Sqm

DSR Item No. 8.3.2: Providing edge moulding to 18 mm thick marble stone counters, Vanities etc., including machine polishing to edge to give high gloss finish etc. complete as per design approved by engineer in charge.
(a): 'Marble/Kota stone/Sand stone work
(b): Granite work

DSR Item No. 8.5 : Extra for providing opening of required size & shape for wash basin/ kitchen sink in kitchen platform, vanity counter and similar location in marble/Granite/stone work, including necessary holes for pillar taps etc. including moulding, rubbing and polishing of cut edges etc. complete.

DSR RA (15): Providing and fixing 18mm thick gang saw cut, mirror polished, machine cut, for flooring and skirting of required size, approved shade, colour and texture laid over 20mm or more thick base cement mortar 1:4 (1 cement : 4 coarse sand), joints treated with white cement, mixed with matching pigment, epoxy touch ups, including rubbing, curing, moulding and polishing edges give high gloss finish etc. complete at all levels as per detailed drawing and as directed by engineer in charge.
(a) : Granite Stone of approved shade

DSR RA (16): Providing and fixing 18mm thick gang saw cut, mirror polished, pre moulded and pre polished, machine cut stone for tread and risers of steps, dedo, jambs, lintels, partition, seat, landing, parapet top, shelves, chajja, sill, devider and similar locations of required size, machine cut edges ,approved shade, colour and texture laid over 20mm thick base cement mortar 1:3(1 cement : 3 coarse sand), joints treated with white cement, mixed with matching pigment, epoxy touch ups, including rubbing, curing, moulding and polishing edges give high gloss finish etc. complete at all levels as per detailed drawing and as directed by engineer in charge.
(a) : Granite Stone of approved shade.

DSR RA (17) : Providing roughened strip 2.5 cm wide to form antiskid surface on treads of stairs in any type of stone including forming straight deep curved gishi (groove), 6 mm wide & 4 mm deep on two sides of the roughened strip, chiseling, polishing the edges, sides and bottom of gishi etc. complete as per sample approved. Only one time length of tread of stair shall be measured for payment.

Please refer to Para 8.0, 8.1, 8.2, 8.3, 8.4,8.5 and 8.6, etc. from Page 308 to page 315 of CPWD Civil Works Specifications 2019 Volume I, for relevant items of work regarding the following :.

- Marble & Granite stone
- Sizes and Tolerance
- Physical Properties of Granite & Marble
- Sampling and Acceptance
- Marble Granite work - Polishing and Finishing, Mortar, Fixing etc.
- Wall lining and veneer work
- Marble/Granite/Kotah stone work for steps, treads and Risers

The work involves fixing of Granite stone for platforms, treads and risers, flooring and dado works. The Granite stone shall be as per the approval of architect and the Engineer in Charge. The sizes of stones used shall be as per pattern on the detailed drawings. The stone used shall be mirror polished or noted otherwise. Normally single piece stone shall be used for the treads and risers of the steps or as per the drawings when noted otherwise. Necessary cutouts shall be provided for fixing sink/wash basins or holes for fixing plumbing fixtures in the platforms. Exposed edges of Granite stones shall be provided with edge moulding as directed. In treads of steps Antiskid surface shall be created as per architectural design with the help of providing grooves and/or roughening approximately 50 mm wide surface of tread near the edge of stone.

Measurements of granite stone in various items listed above shall be in area in sqm. Or in length in Rmt. As stated in detailed BOQ.

SUB HEAD: 8.0
WOOD AND PVC WORK

Please refer to Relevant Paras for Stone Work of CPWD Specifications Volume I – 2019 Page No.345 to 468 (with its latest corrections slips up to the date of submission of the Tender.

Contractor shall strictly follow the procedure laid down in the above specifications for quality of Materials like wood, Wood Plastic composite, glass, ply wood, laminates, veneers, non-asbestos cement boards, wire mesh, hardware, gules and adhesives etc. to be used for doors, windows, partitions, and other related works and Testing of Materials etc. Wood to be used in the work shall be well seasoned timber having minimum of moisture content as required as per relevant Indian Standards, and the quality of wood shall be as specified in the BOQ. Wood Plastic composite wherever used in the work shall be free from any visible defects like warping, cuts in edges, dents in the surface etc. The WPC materials shall be fully weather proof and termite proof, having water absorption less than 10% after 24 hours immersion in water, moisture content less than 3%, should possess very low flammability ,good resistance screw withdrawal etc. The joinery for various components shall be as per detailed drawings and as directed by the Engineer – in – Charge. Necessary relevant testing of materials shall be done as specified and the frequency of testing shall be done as per latest IS codes and as specified in CPWD specifications.

ITEM WISE SPECIFICATIONS FOR WOOD WORK

DSR Item No. 26.86.7 Providing and fixing factory made single extruded WPC (Wood Polymer Composite) solid door Frames comprising of virgin PVC polymer of K value 58-60 (Suspension Grade), calcium carbonate and natural fibers (wood powder/ rice husk/wheat husk) and non-toxic additives (maximum toxicity index of 12 for 100 gms) fabricated with miter joints after applying PVC solvent cement and screwed with full body threaded star headed SS screws having minimum frame density of 750 kg/cum, screw withdrawal strength of 2200 N (Face) & 1100 N (Edge), minimum compressive strength of 58 N/mm2, modulus of elasticity 900 N/mm2 and resistance to spread of flame of Class A category with property of being termite/borer proof, water/moisture proof and fire retardant and fixed in position with M.S hold fast/lugs/SS dash fasteners of required dia and length complete as per direction of Engineer-In-Charge. (M.S hold fast/lugs or SS dash fasteners shall be paid for separately).

Note: For WPC solid door/window frames, minus 5mm tolerance in dimensions i.e depth and width of profile shall be acceptable. Variation in profile dimensions on plus side shall be acceptable but no extra payment on this account shall be made.

DSR Item No. 26.86.1 Providing and fixing factory made single extruded WPC (Wood Polymer Composite) window/Clerestory windows shutter Frames Rails and styles) comprising of virgin PVC polymer of K value 58-60 (Suspension Grade), calcium carbonate and natural fibers (wood powder/ rice husk/wheat husk) and non-toxic additives (maximum toxicity index of 12 for 100 gms) fabricated with miter joints after applying PVC solvent cement and screwed with full body threaded star headed SS screws having minimum frame density of 750 kg/cum, screw withdrawal strength of 2200 N (Face) & 1100 N (Edge), minimum compressive strength of 58 N/mm2, modulus of elasticity 900 N/mm2 and resistance to spread of flame of Class A category with property of being termite/borer proof, water/moisture proof and fire retardant and fixed in position with M.S hold fast/lugs/SS dash fasteners of required dia and length complete as per direction of Engineer-In- Charge. (M.S hold fast/lugs or SS dash fasteners shall be paid for separately).

Note: For WPC solid door/window frames, minus 5mm tolerance in dimensions i.e depth and width of profile shall be acceptable. Variation in profile dimensions on plus side shall be acceptable but no extra payment on this account shall be made.

These Items pertains to the doors and windows frames and frames of partitions or the frames for services shafts closing etc. Twork includes the supplying, cutting, manufacturing and fixing of the WPC materials Frames to the openings.

Materials of the frames shall be best quality Wood Polymer Composite made from blending wood fiber or wood flour with thermoplastic resins and additives. The Materials shall, be required to possess the following properties as per relevant standards of the products.

- Density : Between 500 to 900 Kg/cum. Density should not vary more than 10% from one sample to the other sample.
- Moisture Content – Shall not be less than 5 % and not more than 15 %
- Water Absorption shall not be more than 10% after 2 hours socking in water and not more than 205 after 24 hours socking.
- Linear expansion (swelling in water) shall not be more than 0.5% in both the direction of width and length.
- Tensile strength shall not be less than 5 N/mm2
- Screw withdrawal strength shall be more than 700 N.

The Wood Plastic Composite materials shall be supplied in required shapes of frames and panels. After cutting edges shall be uniform and without any dents or other deformities. The materials shall be suitable for Normal wood working operations.

Measurements of the WPC items shall be done in volume in Cum. For frames of doors and frames of shutters. The Door shutter panels shall be paid in sqm. According to its designation of thickness.

Rates shall be inclusive of all operations from material supply, manufacturing doors/Windows/shutters as per requirements, fixing them in place and polishing/painting (Polishing shall be paid separately under relevant items) complete as per detailed drawings and instructions of Engineer in Charge.

DSR Item No. 26.86.2 Providing and fixing factory made single extruded WPC (Wood Polymer Composite) solid plain flush door shutter of required size comprising of virgin polymer of K value 58-60 (Suspension Grade), calcium carbonate and natural fibers (wood powder/ rice husk/wheat husk) and non toxic additives (maximum toxicity index of 12 for 100 gms) having minimum density of 650 kg/cum and screw withdrawal strength of 1800 N (Face) & 900 N (Edge), minimum compressive strength 50 N/mm2, modulus of elasticity 850 N/mm2 and resistance to spread of flame of Class A category with property of being termite/borer proof, water/moisture proof and fire retardant and fixing with stainless steel butt hinges of required size with necessary full body threaded star headed counter sunk S.S screws, all as per direction of Engineer-In- Charge. (Note: stainless steel butt hinges and necessary S.S screws shall be paid separately)

35 mm thick

The properties of the WPC materials shall be as enumerated in the previous items. This item is for shutters of the doors.

Measurements shall be the area of door shutters in Sqm.

Rate of the item shall include all operations of supplying materials in requisite thickness, Manufacturing shutters as per detailed drawings, fixing shutters to frames with necessary screws, nails, adhesives and hardware fittings. The hardware fittings shall be paid under relevant items.

DSR No. 26.89.1 Providing and fixing factory made single extruded WPC (Wood Polymer Composite) solid board one side white color and other side of board laminated with PVC foil of minimum 14 micron thickness of approved design pasted with hot melt adhesive for cup boards, work stations and bathroom/kitchen cabinet etc. of required sizes comprising of virgin polymer of K value 58-60 (Suspension Grade), calcium carbonate and natural fibers (wood powder/ rice husk/wheat husk) and nontoxic additives (maximum toxicity index of 12 for 100 gms) having minimum density of 650 kg/cum and screw withdrawal strength of 1800 N (Face) & 900 N (Edge), minimum compressive strength 50 N/mm2, modulus of elasticity 850 N/mm2 and resistance to spread of flame of Class A category with property of being termite/borer proof, water/moisture proof and fire retardant and fixing with stainless steel piano hinges/soft close clip on concealed hinges of required size with necessary full body threaded star headed counter sunk S.S screws, all as per direction of Engineer-In- Charge. (Note: stainless steel piano hinges/soft close clip-on concealed hinges and necessary S.S screws shall be paid separately)
18 mm thick

The properties of the WPC materials shall be as enumerated in the previous items. This item is for panelling.

Measurements shall be the area of panelling in Sqm.

Rate of the item shall include all operations of supplying materials in requisite thickness, Manufacturing panels as per detailed drawings, fixing with necessary screws, nails, adhesives and hardware fittings. The hardware fittings shall be paid under relevant items.

Market Rate Item no-(18) WPC fluted panel 25 mm thick
Providing and fixing factory made single extruded WPC (Wood Polymer Composite) solid board one side white color and other side of board

laminted with PVC foil of minimum 14 micron thickness of approved design pasted with hot melt adhesive for cup boards, work stations and bathroom/kitchen cabinet etc. of required sizes comprising of virgin polymer of K value 58-60 (Suspension Grade), calcium carbonate and natural fibers (wood powder/ rice husk/wheat husk) and non toxic additives (maximum toxicity index of 12 for 100 gms) having minimum density of 650 kg/cum and screw withdrawal strength of 1800 N (Face) & 900 N (Edge), minimum compressive strength 50 N/mm2, modulus of elasticity 850 N/mm2 and resistance to spread of flame of Class A category with property of being termite/borer proof, water/moisture proof and fire retardant and fixing with stainless steel piano hinges/soft close clip on concealed hinges of required size with necessary full body threaded star headed counter sunk S.S screws, all as per direction of Engineer-In- Charge. (Note: stainless steel piano hinges/soft close clip on concealed hinges and necessary S.S screws shall be paid separately)

The properties of the WPC materials shall be as enumerated in the previous items. This item is for paneling.

Measurements shall be the area of paneling in Sqm.

Rate of the item shall include all operations of supplying materials in requisite thickness, Manufacturing panels as per detailed drawings, fixing with necessary screws, nails, adhesives and hardware fittings. The hardware fittings shall be paid under relevant items.

DSR Item No. 9.1.1: Providing wood work in frames of doors, windows, clerestory windows and other frames, wrought framed and fixed in position with hold fast lugs or with dash fasteners of required dia & length (hold fast lugs or dash fastener shall be paid for separately).

(a) : Second class teak wood

The relevant specification as per Para 9.3 along with its sub para, of CPWD Civil works specifications 2019 Vol.1, shall be followed for frames of doors, windows, ventilators etc.

This item may be used an alternative item of Wood Plastic Composite.

The frames shall be measured in volume of teak wood used in the making of frames and shall be paid in the unit of Cum.

Market Rate Item no. (19): Providing wood work in frames of Partitions with Glass/Wooden panels/Plywood Panels. Wooden members are to be fixed to cover the Rectangular/ Square M.S. Tube sections of the main

partition frames from all sides as per the detailed drawings including fixing the wooden members with necessary screws, nuts, bolts etc. in such a way that the M.S. Sectiones are covered on all sides and is concealed behind the wooden members. Wooden members of Shutters frame if any and wooden beadings for fixing Glass panels, wooden panels, plywood panels of the partition with wooden members of the frames will also be paid under this same item. The work to be carried out as per the detailed drawings and as directed by Engineer In charge. (hold fast lugs or dash fastener shall be paid for separately)

(a) : Second class teak wood(Alternate item of 26.86.1)

The relevant specification as per Para 9.3 along with its sub para, of CPWD Civil works specifications 2019 Vol.1, shall be followed for frames of doors, windows, ventilators etc.

This item may be used an alternative item of Wood Plastic Composite.

The frames shall be measured in volume of teak wood used in the making of frames and shall be paid in the unit of Cum.

DSR Item no. 9.7.1 : Providing and fixing paneling or paneling and glazing in paneled or paneled and glazed shutters for doors, windows and clerestory windows (Area of opening for panel inserts excluding portion inside grooves or rebates to be measured). Paneling for paneled or paneled and glazed shutters 25 mm to 40 mm thick:

DSR RA (20) (b): Marine Ply wood 18 mm thick

DSR Item No. 9.7.7.2:(c): Float glass panes 5.0 mm thick glass panes

DSR Item No.: 9.7.8 (d): Fly proof stainless steel grade 304 wire gauge with 0.5 mm dia. wire and 1.4 mm wide aperture with matching wood beading

The relevant specification as per Para 9.2 along with its sub para, of CPWD Civil works specifications 2019 Vol.1, shall be followed for the Paneling Materials viz, Teak wood panels, Marin ply panels, Gloat glass panels, wire mesh (Wire Gauze) etc. Para 9.6.4 along with its sub paras refers to the fixing of Panels in shutter frames.

These items may be used an alternative item of Wood Plastic Composite.

Measurements

For paneling of each type or for glazed panel length and width of opening for panels inserts or glazed panels shall be measured correct to a cm before fixing the beading and the area shall be calculated to the nearest 0.01 sq.m.

The portions of the panel inserts or glazed panel inside the grooves or rebates shall not be measured for payment.

Rates

Panels shall be measured in square meters and rates shall include all operations involved in the work.

DSR Item No. 9.21.1+9.23-9.15.1.1: Providing and fixing ISI marked flush door shutters conforming to IS: 2202 (Part I) non-decorative type, core of block board construction with frame of 1st class hard wood and well matched commercial 3 ply veneering with vertical grains or cross bands and face veneers on both faces of shutters, lipping with 2nd class teakwood battens 25 mm minimum depth on all edges of flush door shutters:

(a): 35 mm thick excluding ISI marked Stainless Steel butt hinges with necessary screws

The relevant specification as per Para 9.7 along with its sub para, of CPWD Civil works specifications 2019 Vol.1 shall be followed for the Flush door shutters. Testing of Flush door shutters shall be carried out as per para 9.7.10.

These items may be used an alternative item of shutters with Wood Plastic Composite.

DSR Item No. 9.127 : Providing & Fixing decorative high pressure laminated sheet of plain / wood grain in gloss / matt / suede finish with high density protective surface layer and reverse side of adhesive bonding quality conforming to IS : 2046 Type S, including cost of adhesive of approved quality.

(a):1.0 mm thick on one side only

Decorative high pressure laminates shall conform to thermosetting synthetic resin bonded laminated sheets as per IS 2046. Decorative laminate shall be fixed to flush shutters by gluing under hot press with suitable BWP adhesive. Decorative Laminates shall be measured in square and rates shall include all operations including cost of materials and labour components

Item No. 9.134.1.1.1 : Providing and fixing wire gauge panels using stainless steel grade 304 wire gauge with wire of dia 0.5 mm and average width of aperture 1.4 mm in both directions for doors, windows and clerestory windows with necessary screws and suitable beading

This item is for fixing fly proof wire mesh panel in the door shutter. Wire mesh which shall generally conform to IS 1568 shall be regularly woven with equally spaced Stainless-steel wires in both warp and weft directions. Fly-proof wire mesh (aperture 1.40 mm) is generally provided in Kitchen and dining areas while wire mesh of smaller aperture is used in mosquito proof shutters.

Measurements: Area of Wire mesh panel shall be measured in Sqm.

Rates include all labour, materials screws, nails and bidding suitable for materials used for door shutter.

Market Rate Item no. – (21) : Providing and fixing 5 mm thick glass fixed with wooden beading including the cost of wooden beadings, glass and necessary cutting finishing as per drawing and as directed by Engineer-in-charge.

Market Rate Item no. – (22) Providing and fixing 6 mm thick glass fixed with wooden beading including the cost of wooden beadings, glass and necessary cutting finishing as per drawing and as directed by Engineer-in-charge.

Market Rate Item no. – (23) Providing and fixing frosted glass panes 5 mm thick in doors, windows and clerestory window shutters. (Area of opening for glass panes excluding portion inside rebate shall be measured).

Glass Panels : Glass paneling (Glazing) shall be done with glass as per IS 14900. Glazing in the shutters of doors, windows and ventilators of bath, WC and Lavatories shall be provided with frosted/ clear glass the weight of which shall be not less than 10 kg/sqm. Glass panels shall be fixed by providing a thin layer of putty conforming to IS 419 applied between glass pane and all along the length of the rebate and also between glass panes and wooden beading.

Measurement

The height and width of glass panel as fixed in place shall be measured correct to one centimeter and area calculated in sqm. correct to second place of decimal shall be taken for payment.

Rate

The rate shall include the cost of all the materials, labours involved in all the operations as described in nomenclature of item and particular specification.

Item no. - 8.28.1 Providing and fixing 4 mm thick one side decorative veneer (factory pressed with door shutter or plywood for interior work) conforming to IS: 1328 (type-1) having top layer of 0.5 mm slice thickness decorative veneer and base layer of 3.5 mm thick BWP Gurjan Ply of approved make, shade and pattern/ texture, with necessary screws, adhesive etc. Veneer shall be fixed on ply with or without groove as per drawing. Sample shall be approved before execution the work. Actual installed quantity shall be measured for payment without considering any wastage.

The relevant specification as per 8.16 VENEERED DECORATIVE PLYWOOD along with its sub para, of CPWD Civil works specifications 2019 Vol.1 shall be followed for the Flush door shutters finishing.

Market Rate item (24): Providing and fixing exterior grade non asbestos cement fiber board of approved make with necessary S.S. screws etc. for the covering of Pipe shafts, Cable shafts etc. Complete in pattern with grooves as per drawing and as directed by engineer in-charge. Framing will be paid in relevant items.

(a): 6 mm thick Cement Boards

Market Rate item (25):(b): 8 mm thick Cement Boards

1 Fiber boards shall be of medium density cement board reinforced with wood fiber, produced by fiberizing steamed wood under pressure, blended with adhesive and wax and formed into solid panels under controlled conditions of heat and pressure as per IS 14862.

2 ***Adhesives:*** The adhesive used for bonding shall be BWP type synthetic resin conforming to IS 848.

3 ***Thickness:*** Fiber boards are available in thickness 6, 9, 12, 15, 18, 22, 25, 30, 35 & 40 mm. The tolerance in thickness shall be ± 0.3 mm. Thickness of fiber boards and adhesive used for bonding shall be as specified. Unless otherwise stated, exterior grade fiber boards bonded with BWP type synthetic resin adhesive shall be used.

Relevant specifications of paneling shall be followed as specified and 6 mm thick non asbestos cement fiber board of Shera or equivalent fixed to M.S. structure as per drawing and as directed by engineer in charge.

4 Measurement:
Area of the non-asbestos cement fiber board as describe in item shall be measured in square meter.

5 Rate:

The rate shall include the cost of all materials and labour involved in all the operations described above.

DSR Item No. 9.84 : Providing and fixing aluminum extruded section body tubular type universal hydraulic door closer (having brand logo with ISI, IS:3564, embossed on the body, door weight up to 90 kg and with double speed adjustment with necessary accessories and screws etc. complete.

Please refer General Specifications for door closers as per Para 9.15.22 of the CPWD Civil works specifications 2019 Volume 1.

Market Rate item (26) : Providing & Fixing Zinc Material Combination Finish Door Safety Chain, minimum weight 190 grm. with necessary nickel Plated screws for doors as per drawing and as directed by Engineer-in-charge.

Fitting shall be of stainless-steel SS 304 grade or as specified. These shall be well made, reasonably smooth, and free from sharp edges and corners, flaws and other defects. Screw holes shall be counter sunk to suit the head of specified wood screws.

The fittings generally used for different type of doors and windows as specified. The fittings to be actually provided in a particular work shall, however, be decided by the Engineer-in-Charge.

Screws used for fittings shall be of chromium plated brass screws or stainless-steel screws.

Fittings shall be fixed in proper position as shown in the drawings or as directed by the Engineer-in- Charge. These shall be truly vertical or horizontal as the case may be. Screws shall be driven home with screw driver and not hammered in. Recesses shall be cut to the exact size and depth for the counter sunk of hinges.

Stainless steel Safety chain Ozone make catalogue no OZ DG 22 or equivalent as per manufacture specification shall be fixed to door as per drawing or as directed by engineer in charge.

Measurement:
The SS safety chain as describe in item shall be measured in numbers.

Rate: The rate shall include the cost of all materials and labour involved in all the operations described above.

Market Rate item (27) : Providing & Fixing S.S. 316 Grade C/D Shaped Handles in Satin Finish, 10 mm dia and center to center minimum 150 mm size, minimum weight 140 grm with necessary screws etc. Complete of approved make as per drawing and as directed by engineer-in-charge.

Fitting shall be of stainless steel SS 304 grade or as specified. These shall be well made, reasonably smooth, and free from sharp edges and corners, flaws and other defects. Screw holes shall be counter sunk to suit the head of specified wood screws.

The fittings generally used for different type of doors and windows as specified. The fittings to be actually provided in a particular work shall, however, be decided by the Engineer-in-Charge.

Screws used for fittings shall be of chromium plated brass screws or stainless steel screws.

Fittings shall be fixed in proper position as shown in the drawings or as directed by the Engineer-in- Charge. These shall be truly vertical or horizontal as the case may be. Screws shall be driven home with screw driver and not hammered in. Recesses shall be cut to the exact size and depth for the counter sunking of hinges.

The door handles shall be well made and free from defects. These shall be finished correct to shape and dimensions. All edges and corners shall be removed and finished smooth so as to facilitate easy handling. Cast handle shall be free from casting defects. Where the grip portion of the handle is joined with the base piece by mechanical means, the arrangement shall be such that the assembled handle shall have adequate strength comparable to that of integrally cast type handles.

These shall be of stainless steel SS 304 grade of specified size and of the shape and pattern as approved by the Engineer-in-Charge. The size of the handle shall be determined by the inside grip of the handle. Door handles shall be of 100 mm size and window handles of 75 mm size, unless otherwise specified. These shall be fixed with 25 mm long wood screws of designation No 6. Stainless steel SS 304 grade handles shall be finished bright satin or chromium plated as specified.

Sampling and Criteria for Conformity: The number of handles to be selected from a lot shall depend on the size of lot and shall be in accordance with Table 16. Handles for testing shall be selected at random for at least 10 percent of packages. Subject to a minimum 3, equal number of door handles being selected from each such package. All door handles shall be checked for dimensional requirement and finish. Any door handle which fails to satisfy the requirement of dimensions or finish or both shall be considered as defective.

A lot shall be considered as conforming to requirement of this specification, if the number of defective handles among those tested does not exceed the corresponding number of defectives is greater than or equal to rejection number given in column 4 of Table 16, the lot shall be deemed as not meeting the requirements of this specification.

TABLE 16
Scale of Sampling and Criteria for Conformity

Lot	***Sample size***	***Acceptance no.***	***Rejection no.***
(1)	***(2)***	***(3)***	***(4)***
Upton 50	8	0	1
51 to 90	13	1	2
91 to 150	20	1	2
151 to 280	32	2	3
281 to 500	50	3	4
501 to 1200	80	5	6
1201 and above	125	7	8

The Stainless steel Handle, as per manufacture's standard and fixed to door as per drawing and as directed by engineer in charge.

Measurement:
The SS handle as describe in item shall be measured in numbers.

Rate:
The rate shall include the cost of all materials and labour involved in all the operations described above

Market Rate item (28) : Providing & Fixing S.S. 316 Grade C/D Shaped Handles in Satin Finish, 10 mm dia and center to center minimum 100 mm size, minimum weight 140 grm with necessary screws etc. Complete of approved make as per drawing and as directed by engineer-in-charge

General specifications of the handles are as per the above item no. Market Rate item (27) above except thet the size of handle shall be 100 mm instead of 150 mm.

Market Rate item (29) : Providing & Fixing S.S. 316 Grade Fire resistance BSEN 1634:1:2000 Certified & Mechanically tested BSEN 1935:2002 Satin Finish S.S. 316 Grade 4 ball bearings Hinges approximate size 102mm X 76mm X 3 mm minimum Weight 260 gram of approved make with AISI 316 Grade ball Bearing S.S. Pin, Cap, and with necessary S.S. Self Tapping Phillips Cross Head Screws etc. complete as specified as per drawing and as directed by engineer-in -charge.

Butt Hinges
These shall be of the following types according to the material used.

(a) Stainless steel 316 grade butt hinges.

Stainless steel 316 grade butt hinges: These shall be manufactured from S.S. 316 sheet as per specified thickness.

These shall be well made and shall be free from flaws and defects of all kinds. All hinges shall be cut clean and square and all sharp edges and corners shall be removed. These shall generally conform to IS 12817.

Hinge Pin: Hinge pin shall be made of mild steel wire. It shall fit inside the knuckles firmly and riveted head shall be well formed so as not to allow any play

or shake, and shall allow easy movement of the hinge, but shall not cause looseness.

Knuckles: The number of knuckles in the hinges of different sizes shall be as per IS 12817. The size of knuckles shall be straight and at right angle to the flap. The movement of the hinges shall be free and easy and working shall not have any play or shake.

Screw Holes: The screw holes shall be clean and counter sunk. These shall be suitable for countersunk head wood screws and of the specified size for different types, and sizes of hinges. The size of the holes shall be such that when it is counter sunk it shall be able to accommodate the full depth of counter sunk head of the wood screws. The nos. of screw holes shall as specified in IS 12817.

Sampling and Criteria for Conformity: The number of butt hinges to be selected from a lot shall be depend on size of lot and shall be in accordance with Table 9.11 below. Butt hinges for testing shall be selected at random from at least 10 per cent of the randomly selected packages subjected to minimum of three equal number of hinges being selected from each package. All butt hinges selected shall be checked for dimensions and tolerance requirements. Defects in manufacture and finish shall also be checked and lot shall be considered conforming to the requirement of this specifications, if the number of defective hinges among those tested does not exceed the corresponding number given in Table 9.11.

TABLE 9.11
Scale of Sampling and Criteria for Conformity

SR. No.	Lot size	Sample Size	Permissible No. of Defective hinges
1	2	3	4
1.	Upton 150	5	0
2.	151 to 300	20	1
3.	301 to 500	32	2
4.	501 to 1000	50	3

5.	1001 and above	80	5

Sampling and Criteria for Conformity: The number of butt hinges to be selected from a lot shall depend on the size of lot and shall be in accordance with Table 9.12. Butt hinges for testing shall be taken at random from at least 10 per cent of the package subject to a minimum of three, equal number of hinges being selected from each package. All butt hinges selected from the lot shall be checked for dimensional and tolerance requirements. Defects in manufacture and finish shall also be checked. A lot shall be considered conforming to the requirements of this specification if the number of defective hinges among those tested does not exceed the corresponding number given in Table 9.12.

TABLE 9.12 Scale of Sampling and Criteria for Conformity

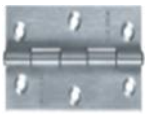
Sl. No.	Lot size	Sample size	Permissible No. of defective hinges
1	Upton 200	15	0
2	201 to 300	20	1
3	301 to 500	30	2
4	501 to 800	40	2
5	801 and above	55	3

Note: Any hinge which fails to satisfy the requirements of any one or more of the characteristics shall be considered as defective hinge.

Rate

Rate includes the cost of materials and labour involved in all the operations described above. The framework and paneling of each type or glazed panels shall be paid separately. The rate for framework includes the cost of hinges and necessary screws as specified description. However, extra shall be paid for providing moulded beading where specified. Nothing extra shall be paid for plain beading.

Market Rate item (30) : Providing & Fixing S.S. 316 Grade Satin Finish Fire resistance BSEN 1634:1:2000 Certified & Mechanically tested BSEN 1935:2002 Hinges without bearings approximate size 76mm X 65mm X 2 mm minimum weight 100 gram of approved make with AISI 316 Grade S.S. Pin, Cap, and with necessary S.S. Self Tapping Phillips Cross Head Screws etc. complete as specified as per drawing and as directed by engineer-in -charge.



The relevant specification shall be followed as per the above mentioned item of hinges except that the size of hinges should be taken 76 mm X 65 mm X 2 mm instead of 102 mm X 76 mm X 3 mm.

Market Rate item (31) : Providing & Fixing S.S. 304 Grade Stainless Steel Satin Finish Round Tower bolt of overall length (excluding Bracket) 300 mm and inner bolt of dia meter 12mm and outer barrel dia meter 16 mm, minimum weight 430 gram. of approved make with necessary Nickel-Plated Screws complete as per specified as per drawing and directed by Engineer in charge.

Fitting shall be of stainless-steel SS 304 grade or as specified. These shall be well made, reasonably smooth, and free from sharp edges and corners, flaws and other defects. Screw holes shall be counter sunk to suit the head of specified wood screws.

The fittings generally used for different type of doors and windows as specified. The fittings to be actually provided in a particular work shall, however, be decided by the Engineer-in-Charge.

Screws used for fittings shall be of chromium plated brass screws or stainless-steel screws.

Fittings shall be fixed in proper position as shown in the drawings or as directed by the Engineer-in- Charge. These shall be truly vertical or horizontal as the case may be. Screws shall be driven home with screw driver and not hammered in. Recesses shall be cut to the exact size and depth for the counter sunk of hinges.

Tower bolts shall be well made and shall be free from defects. The bolts shall be finished to the correct shape and shall have a smooth action. All tower bolts made with sheet of 1.2 mm thickness and above shall have counter sunk screw holes to suit counter sunk head of wood screws. All sharp edges and corners shall be removed and finished smooth.

The height of knob of tower bolt when the door, window etc. is in closed position from the floor level shall be not more than 1.9 meter.

The knobs of stainless-steel tower bolts shall be cast and the bolt fixed with knob, steel spring and ball shall be provided between the bolt and the barrel.

Sampling and Criteria for Conformity: It shall be same as specified in above.

The Stainless-steel tower bolts as per manufacture's standard and fixed to door as per drawing and as directed by engineer in charge.

Measurement:
The Stainless-steel tower bolts as describe in item shall be measured in numbers.

Rate:
The rate shall include the cost of all materials and labour involved in all the operations described above

Market Rate item (32) : Providing & Fixing S.S. 304 Grade Stainless Steel Satin Finish Round Tower bolt of overall length (excluding Bracket) 100 mm and inner bolt of dia meter 12mm and outer barrel dia meter 16 mm, minimum weight 150 gram of approved make with necessary nickel Plated Screws complete as per specified as per drawing and directed by Engineer in charge.

The relevant specifications shall be same as 300 mm round tower bolt mentioned above except that length and weight shall be as per manufacture's standard and fixed to door as per drawing and as directed by engineer in charge.

Measurement:
The Stainless-steel tower bolts as describe in item shall be measured in numbers.

Rate:
The rate shall include the cost of all materials and labour involved in all the operations described above

Market Rate item (33) : Providing & Fixing AISI S.S. 316 Grade Solid Window Casement stay/adjustor with minimum weight 280 gram of size diameter 14 mm, length 200 mm with necessary fixing screws as specified as per drawing & as directed by engineer-in-charge.

The relevant specifications shall be as per manufactures standard and fixed to window as per drawing and as directed by engineer in charge.

Measurement:
The Stainless-steel window casement as describe in item shall be measured in numbers.

Rate:
The rate shall include the cost of all materials and labor involved in all the operations described above.

Market Rate item (34) : Providing & Fixing Fire resistance BSEN 1634:1:2000 Certified & Mechanically tested BSEN 1906:2010 Pair of AISI S.S. 316 Grade Satin Finish hollow Pipe or solid design Mortise Handle with the minimum weight 620 gram key hole for Mortise Pin Cylinder, high grade brass bushing for extra fixing strength for intensive use of door with back to back fixing screws system of approved make with both side active mortise handle and spindle, High Quality Stainless Steel Wood Screws (8 PCS.) for minimum door thickness 30 mm as per drawing and as directed by engineer in charge. The Inner and Outer Rose of Mortise handle and Escutcheons must be of AISI 316 grade only.

Fitting shall be of stainless-steel SS 304 grade or as specified. These shall be well made, reasonably smooth, and free from sharp edges and corners, flaws and other defects. Screw holes shall be counter sunk to suit the head of specified wood screws.

The fittings generally used for different type of doors and windows as specified. The fittings to be actually provided in a particular work shall, however, be decided by the Engineer-in-Charge.

Screws used for fittings shall be of chromium plated brass screws or stainless-steel screws.

Fittings shall be fixed in proper position as shown in the drawings or as directed by the Engineer-in- Charge. These shall be truly vertical or horizontal as the case may be. Screws shall be driven home with screw driver and not hammered in. Recesses shall be cut to the exact size and depth for the counter sunking of hinges.

This is a mortise lock having a single spring bolt withdrawn from the outside by using the key and from inside by key and with an arrangement.

The Stainless-steel Mortise Handle as per manufacture's standard and fixed to door as per drawing and as directed by engineer in charge.

Measurement:
The Mortise handle as describe in item shall be measured in numbers.

Rate:
The rate shall include the cost of all materials and labour involved in all the operations described above

Market Rate item (35) : Providing & Fixing Fire resistance BSEN 1634:1:2000 Certified & Mechanically tested BSEN 1906:2010 Pair of AISI S.S. 316 Grade Satin Finish Hollow Pipe or solid design Mortise Handle with the minimum weight 930 gram with S.S. 316 Grade euro profile escutcheons key hole for Mortise Pin Cylinder, high grade brass bushing for extra fixing strength for intensive use of door with back-to-back fixing screws system. of approved make with both side active mortise handle and spindle, High-Quality Stainless-Steel Wood Screws (8 PCS.) for minimum door thickness 30 mm as per drawing and as directed by engineer in charge. The Inner and Outer Rose of Mortise handle and Escutcheons must be of AISI 316 grade only.

The relevant specification shall be followed as per above mentioned item of mortise handle except that the weight of the handle shall be 930 gm.
The Stainless-steel Mortise Handle as per manufacture's standard and fixed to door as per drawing and as directed by engineer in charge.

Measurement:

The Mortise handle as describe in item shall be measured in numbers.

Rate:
The rate shall include the cost of all materials and labor involved in all the operations described above.

Market Rate item (36) : Providing & Fixing Satin Finish Double Door Lock body, 26 mm brass latch. 52 mm lock with Back Set center of approximate size 85 X 45 mm, of approved make, minimum Weight 0.880 gram suitable for minimum 30 mm/35 mm thick Double Door Shutter with necessary fixing screw as specified as per drawing and as per directed by engineer in charge.

The Stainless steel Latch and lock, as per manufacture's standard and fixed to door as per drawing and as directed by engineer in charge.

Measurement:
The latch and lock as describe in item shall be measured in numbers.

Rate:
The rate shall include the cost of all materials and labour involved in all the operations described above

Market Rate item (37) : Providing & Fixing Fire resistance BSEN 1634:1:2000 Certified Satin Finish Mortise Lock body approximate size of back set 45 mm X 85 mm, with 52 mm Lock and 26 mm brass latch, Stainless steel main & Strike plate & including back-to-back fixing feature suitable for minimum door thickness 30 mm/35 mm Single door shutter with necessary fixing screw as per specified as per directed by engineer in charge.

The Stainless Latch and lock, as per manufacture's standard and fixed to door as per drawing and as directed by engineer in charge.

Measurement:
The latch and lock as describe in item shall be measured in numbers.

Rate:
The rate shall include the cost of all materials and labour involved in all the operations described above

Market Rate item (38) : Providing & Fixing Fire resistance BSEN 1634:1:2000 Certified Satin Finish Mortise Latch body with back set approximate size of 45 mm, Stainless Steel main & Strike Plate of approved make suitable for minimum 30 mm/ 35 mm thick Single door Shutter with necessary fixing screw as specified as per drawing and as directed by engineer in charge.

The Stainless Latch and lock, as per manufacture's standard and fixed to door as per drawing and as directed by engineer in charge.

Measurement:
The latch as describe in item shall be measured in numbers.

Rate:
The rate shall include the cost of all materials and labor involved in all the operations described above

Market Rate item (39) : Providing & Fixing Satin Finish 6 pin Mechanism, high Quality brass body Mortise Pin Cylinder with 5 high accuracy Computerized Dotted keys of approved make one side key & one side knob suitable for minimum door thickness 30 mm/35 mm with necessary Fixing Screw as specified and as per drawing and as per directed by engineer in charge.

The Cylinder lock, as per manufacture's standard and fixed to door as per drawing and as directed by engineer in charge.

This is a Cylinder lock having a single spring bolt withdrawn from the outside by using the key and from inside by Knob with an arrangement to lock the door.

Measurement:
The Cylinder lock as describe in item shall be measured in numbers.

Rate:
The rate shall include the cost of all materials and labour involved in all the operations described above

Market Rate item (40) : Providing & Fixing Fire resistance BSEN 1634:1:2000 Certified Satin Finish Secure Standard 5 pin Mechanism Mortise Pin Cylinder with both Side Keys, high accuracy Brass keys of approved make suitable for minimum door thickness 30 mm/35 mm with necessary fixing screw as per specified and as per drawing and as per directed by engineer in charge.

The Cylinder lock, as per manufacture's standard and fixed to door as per drawing and as directed by engineer in charge.

This is a Cylinder lock having a single spring bolt withdrawn from the outside by using the key and from inside by Knob with an arrangement.

Measurement:
The Cylinder lock as describe in item shall be measured in numbers.

Rate:
The rate shall include the cost of all materials and labour involved in all the operations described above

Market Rate item (41) : Providing & Fixing Fire resistance BSEN 1634:1:2000 Certified Satin Finish Secure Standard 5 pin Mechanism half Mortise Pin Cylinder with high accuracy Brass keys of approved make one side key suitable for minimum door thickness 30 mm/35 mm with necessary fixing screw as per specified and as per drawing and as per directed by engineer in charge.

The Cylinder lock, as per manufacture's standard and fixed to door as per drawing and as directed by engineer in charge.

This is a Cylinder lock having a single spring bolt withdrawn from the outside by using the key and from inside by Knob with an arrangement.

Measurement:
The Cylinder lock as describe in item shall be measured in numbers.

Rate:
The rate shall include the cost of all materials and labour involved in all the operations described above

Market Rate item (42) : Providing & Fixing Fire resistance BSEN 1634:1:2000 Certified Satin Finish Secure standard mortise type lock body , Pin Cylinder for flush door with thumb turn inside and emergency release and indicator outside for toilet door shutter 35 mm thick with necessary fixing screw as per specified and as per drawing and as per directed by engineer in charge.

The Cylinder lock, as per manufacture's standard and fixed to door as per drawing and as directed by engineer in charge.

This is a Cylinder lock having a single spring bolt withdrawn from the outside by using the emergency release mechanism and from inside by Knob with an arrangement.

Measurement:
The Cylinder lock as describe in item shall be measured in numbers.

Rate:
The rate shall include the cost of all materials and labour involved in all the operations described above

Market Rate item (43) :: Providing & fixing high Quality Zinc Material Satin Finish baby latch/Indicator Bolt inner only with the size 87 mm of approved make with necessary SS Screw etc. complete as specified as drawing as directed by engineer-in- charge

1.0 The relevant specifications shall be same as per tower bolt mentioned above except that length and weight shall be as per manufacture's standard and fixed to door as per drawing and as directed by engineer in charge.

2.0 Measurement:
The Stainless steel indicator bolt as describe in item shall be measured in numbers.

3.0 Rate: The rate shall include the cost of all materials and labour involved in all the operations described above

Market Rate item (44) :: Providing & Fixing Satin Finish S.S. Door Magnet length of 75 mm of approved make, minimum Weight 150 gram with necessary nickel plated screw complete, as specified, as per drawing and as directed by engineer in charge.

Fitting shall be of stainless-steel SS 304 grade or as specified. These shall be well made, reasonably smooth, and free from sharp edges and corners, flaws and other defects. Screw holes shall be counter sunk to suit the head of specified wood screws.

The fittings generally used for different type of doors and windows as specified. The fittings to be actually provided in a particular work shall, however, be decided by the Engineer-in-Charge.

Screws used for fittings shall be of chromium plated brass screws or stainless-steel screws.

Fittings shall be fixed in proper position as shown in the drawings or as directed by the Engineer-in- Charge. These shall be truly vertical or horizontal as the case may be. Screws shall be driven home with screw driver and not hammered in. Recesses shall be cut to the exact size and depth for the counter sinking of hinges.

This shall be made of cast Stainless steel of overall size as specified and shall have rubber cushion. The shape and pattern of stopper shall be approved by the Engineer-in-Charge. The size of magnetic door stopper shall be determined by the length of its plate. It shall be well made and shall have four counter sunk holes for fixing the door stoppers to the wall by means of wood screws. The body for housing of the door stopper shall be cast in one piece and it shall be fixed to the cover plate by means of brass or mild steel screws and cover plate shall be SS finish. The spring shall be fixed firmly to the pin. Tongue which would be pressed while closing or opening of the door shall be connected to the lower part by means of copper pin. On the extreme end a rubber piece shall be attached to absorb shock. All parts of the door stopper shall be of

good workmanship and finish, burrs and sharp edges removed. It shall be free from surface and casting defects.

Measurement:

The Stainless-steel magnetic door stopper as describe in item shall be measured in numbers.

Rate:

The rate shall include the cost of all materials and labour involved in all the operations described above.

Market Rate item (45) :: Providing & Fixing high Quality Zinc Material Door Stopper length of 150 mm including Rubber of approved make minimum Weight 260 gram with necessary Screws etc. complete as specified, as per drawing as directed by engineer-in-charge.

Fitting shall be of stainless-steel SS 304 grade or as specified. These shall be well made, reasonably smooth, and free from sharp edges and corners, flaws and other defects. Screw holes shall be counter sunk to suit the head of specified wood screws.

The fittings generally used for different type of doors and windows as specified. The fittings to be actually provided in a particular work shall, however, be decided by the Engineer-in-Charge.

Screws used for fittings shall be of chromium plated brass screws or stainless steel screws.

Fittings shall be fixed in proper position as shown in the drawings or as directed by the Engineer-in- Charge. These shall be truly vertical or horizontal as the case may be. Screws shall be driven home with screw driver and not hammered

in. Recesses shall be cut to the exact size and depth for the counter sunk of hinges.

This shall be made of cast brass of overall size as specified and shall have rubber cushion. The shape and pattern of stopper shall be approved by the Engineer-in-Charge. It shall be of brass finished bright, chromium plated or oxidized or as specified. The size of magnetic door stopper shall be determined by the length of its plate. It shall be well made and shall have four counter sunk holes for fixing the door stoppers to the wall by means of wood screws. The body for housing of the door stopper shall be cast in one piece and it shall be fixed to the cover plate by means of brass or mild steel screws and cover plate shall be SS finish. The spring shall be fixed firmly to the pin. Tongue which would be pressed while closing or opening of the door shall be connected to the lower part by means of copper pin. On the extreme end a rubber piece shall be attached to absorb shock. All parts of the door stopper shall be of good workmanship and finish, burrs and sharp edges removed. It shall be free from surface and casting defects

Measurement:
The Stainless-steel door mounted door stopper as describe in item shall be measured in numbers.

Rate:
The rate shall include the cost of all materials and labour involved in all the operations described above.

Market Rate item (46) :: Providing & Fixing AISI S.S. 316 Grade Satin Finish Wall/Floor mounted Door Stop with the length of 75 mm to 100 mm including Rubber, minimum Weight 150 gram of approved make with necessary SS screws etc. complete as specified as per drawing and as directed by engineer-in-charge.

The relevant specification shall be followed as per above mentioned item of floor mounted door buffer.

Measurement:
The Stainless-steel wall mounted door buffer as describe in item shall be measured in numbers.

Rate:
The rate shall include the cost of all materials and labour involved in all the operations described above.

Market Rate item (47) :: Providing & Fixing Zinc Material Door Eye Viewer of Dia. 36mm approved make with wide angle vision and fixing accessories as specified as per drawing as directed by engineer-in-charge.

Fitting shall be of stainless-steel SS 304 grade or as specified. These shall be well made, reasonably smooth, and free from sharp edges and corners, flaws and other defects. Screw holes shall be counter sunk to suit the head of specified wood screws.

The fittings generally used for different type of doors and windows as specified. The fittings to be actually provided in a particular work shall, however, be decided by the Engineer-in-Charge.

Screws used for fittings shall be of chromium plated brass screws or stainless-steel screws.

Fittings shall be fixed in proper position as shown in the drawings or as directed by the Engineer-in- Charge. These shall be truly vertical or horizontal as the case may be. Screws shall be driven home with screw driver and not hammered in. Recesses shall be cut to the exact size and depth for the counter sunk of hinges.

The magic eye as per manufacture’s standard and fixed to door as per drawing and as directed by engineer in charge.

Measurement:
The magic eye as describe in item shall be measured in numbers.

Rate:

The rate shall include the cost of all materials and labour involved in all the operations described above.

Market Rate No. (48): Mirror

Providing and fixing with approved hardware 6mm thick mirror of approved make in any shape and sizes as per drawing. Mirror shall be fixed on 6mm thick cement bonded particle board/ fiber cement board (smooth finish) backing in plumb and level. Cement bonded particle board shall be fixed to wall with approved accessories like CP brass screws and washers etc. all complete for all floors/ all levels/ all heights as directed by engineer in charge. Out to out area of actual installed mirror shall be considered for payment without wastage.

1.0 Materials:

The mirror shall be of superior quality crystal clear. It shall be free from flaws, specks or bubbles. The size of the mirror shall be as per drawing and its thickness shall not be less than 6 mm. It shall be uniformly silver plated at the back and shall be free from silvering defects. Silvering shall have a protective uniform covering of red lead paint.

2.0 Workmanship:

Glass shall be fixed with 6mm thick fiber cement board backing. Fiber cement board shall be fixed on wall with SS/brass fasteners. Glass shall be fixed on board with silicon sealant and/ or 3M tape as directed by engineer in charge.
Mirror shall be fixed with wall with approved accessories like CP brass screws and washers etc.

3.0 Mode of Measurements and Payment:

Out to out dimension of installed mirror shall be measured for payment without considering any wastage.

The rate shall be for unit of One Sqm.

SUB HEAD: 9.0
STEEL WORK

Please refer to Relevant Paras for Steel Work of CPWD Specifications Volume I – 2019 Page No.472 to 523 (with its latest corrections slips up to the date of submission of the Tender.

Contractor shall strictly follow the procedure laid down in the above specifications for quality of Materials like Structural Steel sections and M.S. pipes, M.S. Tubular sections, Nuts, Bolts, Rivets, Welding Electrodes, Rolling shutters, Bearings, Springs, Stainless steel pipes and sections, Glass, Primer etc. and Testing of Materials etc. Strength parameters of various materials shall be as per relevant Indian Standards, and the quality of materials shall be as specified in the BOQ. The joinery for various components shall be as per detailed drawings and as directed by the Engineer – in – Charge. Necessary relevant testing of materials shall be done as specified and the frequency of testing shall be done as per latest IS codes and as specified in CPWD specifications.

ITEM WISE SPECIFICATIONS FOR STEEL WORK

DSR Item No. 10.25.1 : Steel work welded in built up sections/ framed work including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer using structural steel etc. as required.

DSR Item No. 10.25.2: (b): In gratings, frames, guard bar, ladder, railings, brackets, gates, and similar works.

Please refer to Para 10.17, of CPWD Civil works specifications 2019 Volume 1 for detailed specifications of Stringers, landings, staircase railings, grating, guard bars, safety grills, ladders, gates and similar works.

DSR RA (49) : Steel work in built up tubular (round, square or rectangular hollow tubes etc) for railing, had rail, gate, grill door, sleeve, framing work for wall paneling, supporting framing for masonry work, supporting frame for doors etc. including cutting, hoisting, fixing in position and applying specified priming coat with epoxy primer and Painting with minimum 2 coat of Water-based acrylic polyurethane enamel paint, having low VOC (Volatile Organic Compound) content, of approved make and shade and as directed by architect and engineer in charge.

b) Hot finished seamless type tubes

General Specification of this Item shall be followed as per Para 10.13 of CPWD Civil works specifications 2019 volume 1. The Work pertains to Fabrication and erection of Tubular sections framing for Partitions instead of trusses as in para 10.13. The framing for partitions shall be erected in true line, level and plumb as per detailed drawings and as directed by Engineer – in – Charge. The joints between the various members shall be ground smooth and the partition frames shall be fixed firmly with wall and slabs with necessary holdfasts/anchor fasteners/by welding with pre-fixed insert plates as the case may be. Holdfasts/Anchor fasteners/insert plates shall be paid separately under relevant items.

The weight of all sections used for partition frames shall be measured and paid for.

Rates include cost all materials and cost of labour for all operations.

DSR Item No. 10.27.3 : Providing and fixing carbon steel galvanized (minimum coating 5 micron) dash fastener of 10 mm dia double threaded 6.8 grade (yield strength 480 N/mm2), counter sunk head, comprising of 10 m dia polyamide PA 6 grade sleeve, including drilling of hole in frame , concrete/ masonry, etc. as per direction of Engineer-in-charge.

(a) :10 x 120 mm

DSR Item No. 10.27.2: (b):10 x 80 mm

Use light duty universal door/window fixing anchors HRD HR2 or equivalent of 10 mm dia. (120 mm long or 80 mm long as the case may be). The anchor should be made of polyamide sleeve PA6 grade and stainless steel A2 Grade.

Measurements

Measurements for the dash fastener shall be in number.

Rate

The rate shall include the cost of all materials and labor involved in all the operation described above.

Market Rate Item no. (50) : Supplying and installing 4mm GI Wire Chain Link Fencing PVC coated, of approved shade & colour on structure composed of 60.3 mm diameter MS CHS columns at 3 m centre to centre, & frame composed of 10mm MS bars, 40x25x5 ISA & 40x5 MS Flats, all MS items painted with approved paints, fixed in ground complete as per drawing and as directed by engineer in charge.(excluding cost of RCC Foundation)

General Specification of this Item shall be followed as per Para 16.59 of CPWD Civil works specifications 2019 volume 1.

Measurements

Measurements for the fencing shall be in Sqm.

Rate

The rate shall include the cost of all materials and labor involved in all the operation described above.

SUB HEAD: 10.0
FLOORING WORK

Please refer to Relevant Paras for Flooring Work of CPWD Specifications Volume I – 2019 Page No.527 to 565 (with its latest corrections slips up to the date of submission of the Tender.

Contractor shall strictly follow the procedure laid down in the above specifications for quality of Materials like Bricks for flooring, Concrete, Kotah stones, Red Mandana stones, Rough kota stone, sand stones, Bundi stone, Dholpur stone, Ceramic Glazed tiles, Rectified Ceramic tiles, Vitrified tiles, Endura Vitrified tiles, Terracotta tiles, Glazed terracotta tiles, Terracotta pavers, Red Mandana stone pavers and cobbles, concrete pavers etc. vinyl flooring, and Testing of Materials etc. Quality of materials and the polishing, texture etc. for various stones, tiles and pavers/cobbles shall be the best as specified in the BOQ and as approved by Engineer – in – Charge. Contractor shall submit the samples of all the flooring materials well in advance and get approval from Engineer – in – Charge before actually procuring the materials. Sizes of various stones and tiles shall be as required for the flooring to be laid to the pattern as per the detailed drawings and as directed. The flooring laid shall be Finished/polished smooth or otherwise as per the texture required according to relevant items of BOQ and as directed by the Engineer – in – Charge. Necessary Mock ups for individual types of flooring for the patterns as per detailed drawings shall be prepared and got approved from the Architect and Engineer in Charge before taking up the work at full scale. There shall be no undulations and offsets between adjoining stones/tiles, what so ever in any kind variety of flooring.

ITEM WISE SPECIFICATIONS FOR FLOORING WORK

DSR Item No. 11.1.2 : Brick on edge flooring with bricks of class designation 7.5 on a bed of 12 mm cement mortar, including filling the joints with same mortar, with common burnt clay non modular bricks: 1:6 (1cement : 6 coarse sand).

Please refer para 11.1 – Brick on Edge Flooring of CPWD specifications for Civil works 2019 Volume 1.

DSR Item No. 11.3.1 : Cement concrete flooring 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate) finished with a floating coat of neat cement, including cement slurry, but excluding the cost of nosing of steps etc. complete 40 mm thick with 20 mm nominal size stone aggregate

Please refer para 11.2 Cement Concrete Flooring of CPWD specifications for Civil works 2019 Volume 1.

DSR Item No. 11.26.1 : Kota stone slab over 20 mm or more thick base laid over and jointed with grey cement slurry mixed with pigment to match the shade of the slab, including rubbing and polishing complete with base of cement mortar 1 : 4 (1 cement : 4 coarse sand)

(a) 25 mm thick

Please refer para 11.20 Cement Concrete Flooring of CPWD specifications for Civil works 2019 Volume 1.

Market Rate Item no. (51) : Extra rate over above item in flooring for using Sand stone slabs/Red mandana in place of Kota stone slabs.

Please refer para 11.23 Cement Concrete Flooring of CPWD specifications for Civil works 2019 Volume 1.

DSR item No. 11.27 : Kota stone slabs 20 mm thick in risers of steps, skirting, dado and pillars laid on 12 mm (average) thick cement mortar 1:3 (1 cement: 3 coarse sand) and jointed with grey cement slurry mixed with pigment to match the shade of the slabs, including rubbing and polishing complete.

Please refer para 11.21 Kota stone flooring of CPWD specifications for Civil works 2009 Volume 1.

Market Rate Item no. (52) : Extra rate over above item in tread & risers of steps, skirting, dado and pillars for using Sand stone slabs in place of Kotah stone slabs.

Please refer para 11.23 Flooring of CPWD specifications for Civil works 2019 Volume 1.

DSR Item no. 8.6 : Extra for Mirror polishing over normal polishing of marble work/Granite work/stone work where ever required to give high gloss finish complete.

Polishing

After completion of the simple polishing the grinding shall be carried out using carborundum stone grade 500 to 2000 in successive order and final finishing with emery of grade 2000, to give a smooth and shining Mirror polished finish.

Measurements

Length shall be measured along the finished face of skirting or dado correct to a cm. This shall be measured correct to a mm in the case of skirting and correct to a cm in the case of dado. The area shall be calculated in square meter correct to two places of decimal.

Market Rate item (53) : **Kota stone slab 25 mm thick approved color, shade & texture with machine cut edges in Kitchen platforms, vanity counters, facia, sills, jams, lintels, partition, seat, landing, parapet top , shelves, chajja and similar locations of required size and in full length, over 20 mm or more thick cement mortar 1:3 (1 cement 3 coarse sand) laid to line and level and jointed with grey cement slurry mixed with pigment to match the shade of the slabs, including rubbing and polishing complete as per drawing and as directed by engineer in charge.**

Market Rate item (54) : Extra rate over above item in Kitchen platforms, vanity counters, facia, sills, jams, lintels, partition, seat, landing, parapet top , shelves, chajja and similar locations for using Sand stone slabs in place of Kota stone slabs

Market Rate item (55) : Providing & laying sandwich platform comprising of a) Sandwich of 18 mm thick single side polish Granite of approved size, shade and sample on top and 30 mm thick polished kota in bottom with 25mm thick cement mortar (1:4) in between b) Vertical sandwich supports of 30 mm thick two kota stone at sutable location and Exposed

end walls of vertical supports shall be of 18 mm thick granite. c) 75 mm raised platform at bottom with kota on top and 50mm C.C. 1:2:4 or CM (1:4) at bottom, skirting matching with flooring as per design and approved sample. The rate includes rounding, champhering and mirror polishing of edges, facias of granite, MS support including necessary bonding adhesive (if required). Rate shall be also inclusive of making holes & cutouts for wash basin, Piller tap / Bib tap etc. as directed by engineer in charge. (Only plan area shall be measured & paid for). Rate shall be included all kota & granite mentioned in above.

Relevant specifications shall be followed as per CPWD vol-1, clause no-8.1.3, 8.2, 8.3, 8.4, 8.5, 8.7,11.21, 11.22 for stone, except type, color, size, thickness, pattern and finishing of stone shall be as per item description and Stones shall be laid over average 25mm or more thick cement mortar (1:4) in between b) Vertical sandwich supports of 30 mm thick two kota stone on sides and 20mm CM (1:4) in between at suitable locations. Exposed end walls vertical supports shall be of 18 mm thick granite. c) 75 mm raised platform at bottom with kota on top and 50mm C.C. 1;2:4 or CM (1:4) at bottom, skirting to match with flooringas per design and approved sample. The rate includes rounding, champhering and mirror polishing of edges, facias of granite, MS support including necessary bonding adhesive (if required). Rate shall be also inclusive of making holes & cutouts for SS sink, Oval wash basin, Piller tap / Bib tap etc. as directed by engineer in charge but fixtures shall be paid in relevant tender items. (Only plan area shall be measured & paid for).

Rate shall be inclusive of bedding mortar, pigment, cutting with wire cut machine and all type of wastage.

Rate shall be for unit of One Sqm.

Market Rate item (56) : Rough Kota stone slab flooring over 20 mm or more thick base laid over and jointed with grey cement slurry mixed with pigment to match the shade of the slab, including rubbing and mirror polishing complete with base of cement mortar 1: 4 (1 cement: 4 coarse sand) as per drawing and as directed by engineer in charge.as per drawing and as directed by Engineer In Charge.

Please refer para 11.21 and 11.22 of CPWD specifications for Civil works 2019 Volume 1 except that item shall be executed with rough kota stone.

Market Rate item (57) : Rough Kota stone slabs 20 mm thick of approved color, shade & texture in tread & risers of steps, skirting, dado and pillars

similar locations of required size with machine cut edges over 12 mm (average) thick cement mortar 1:3 (1 cement 3 coarse sand) laid to line and level and jointed with grey cement slurry mixed with pigment to match the shade of the slabs, including nosing, rubbing and polishing of Machin cut edges, cleaning complete as per drawing and as directed by engineer in charge.

Please refer para 11.21 and 11.22 of CPWD specifications for Civil works 2019 Volume 1 except that item shall be executed with rough kota stone

DSR item no - 8.6 Extra for Mirror polishing over normal polishing of marble work/Granite work/kota stone work (floors, steps, jambs etc.) where ever required to give high gloss finish complete.

Mirror Polishing
After completion of the simple polishing the grinding shall be carried out using carborundum stone grade 500 to 2000 in successive order and final finishing with emery of grade 2000 , to give a smooth and shining Mirror polished finish

Rate shall be for unit of One Sqm.

Market Rate item (58) : Extra for River-washed finish/ leather finish polishing on marble/Granite/rough kota stone where ever required to give rough finish complete as per drawing and as directed by engineer in charge.

Preparation: The stone surface must be clean and free from dust, dirt, grease, and any previous coatings before applying the finish.

Methodology: The rough, river-washed finish shall be achieved by one of the following methods, subject to the approved sample.

1. Mechanical Brushing/Texturing: The stone surface shall be mechanically treated using a rotary power polisher fitted with hard nylon or steel brushes and/or coarse grit diamond abrasive pads (starting with a coarse grit and potentially moving to a slightly finer, but still rough, grit) to create a consistent, worn, and textured look.

2. Sandblasting: The surface shall be blasted with a fine grit material to create a uniformly textured, rustic, and non-slip finish.

3. Acid Washing (for suitable stones like certain limestones): A controlled application of specific acids or chemicals may be used to etch the surface and create a rough texture. This process requires careful handling, neutralisation, and thorough rinsing with clean water to remove all chemical residues.

- Inspection: The Architect or Engineer-in-Charge shall inspect and approve a sample area of the finished texture before the contractor proceeds with the entire area.

- Finish Standard: The final texture shall provide a significant increase in coefficient of friction (COF) compared to a polished finish, ensuring enhanced slip resistance, particularly in wet areas if applicable.
- Cleaning: The finished surface shall be thoroughly cleaned of all slurry, grit, or chemical residues and wiped down with a clean, damp cloth.
- Sealing (Optional but Recommended): A suitable, penetrating, matte-finish stone sealer, approved by the Engineer-in-Charge, may be applied to protect the stone and ease maintenance without compromising the rough texture.
- Rate shall be for unit of One Sqm.

DSR Item No. 11.36 : Providing and fixing Ist quality ceramic glazed wall tiles conforming to IS: 15622 (thickness to be specified by the manufacturer), of approved make, in all colours, shades except burgundy, bottle green, black of any size as approved by Engineer-in-Charge, in skirting, risers of steps and dados, over 12 mm thick bed of cement mortar 1:3 (1 cement : 3 coarse sand) and jointing with grey cement slurry @ 3.3kg per sqm, including pointing in white cement mixed with pigment of matching shade complete.

Please refer para 11.11 Pressed Ceramic tiles in skirting and dado of CPWD specifications for Civil works 2019 Volume 1.

DSR Item no. 11.37: Providing and laying Ceramic glazed floor tiles of size 300x300 mm (thickness to be specified by the manufacturer) of 1st quality conforming to IS: 15622 of approved make in colours such as White, Ivory, Grey, Fume Red Brown, laid on 20 mm or more thick cement mortar 1:4 (1 Cement: 4 Coarse sand), including pointing the joints with white cement and matching pigment etc., complete.

Please refer para 11.15 Pressed Ceramic tiles in skirting and dado of CPWD specifications for Civil works 2019 Volume 1.

DSR Item 11.41.2: Providing and laying vitrified floor tiles in different sizes (thickness to be specified by the manufacturer) with water absorption less than 0.08% and conforming to IS: 15622, of approved make, in all colours and shades, laid on 20mm or more thick cement mortar 1:4 (1 cement: 4 coarse sand), including grouting the joints with white cement and matching pigments etc., complete.

(a): Size of Tile 600x600 mm

DSR Item No. 11.41.3: (b): Size of Tile 800x800 mm

1 Operations as described in above ceramic flooring tiles shall be followed except the vitrified tiles shall conform to Table 12 of IS 15622 (Tiles with water absorption E ≤ 0.08 per cent Group BIa) and the joint thickness in flooring shall not be more than 1mm.

2 Rate

The rate for flooring shall include the cost of all materials and labour involved in all the operations described above. Nothing extra shall be paid for the use of cut (sawn) tiles in the work.

DSR item No. 11.46.2: Providing and laying Vitrified tiles in different sizes (thickness to be specified by manufacturer), with water absorption less than 0.08 % and conforming to I.S. 15622, of approved make, in all colours & shade, in skirting, riser of steps, over 12 mm thick bed of cement mortar 1:3 (1 cement: 3 coarse sand), including grouting the joint with white cement & matching pigments etc. complete.

(a): Size of Tile 600x600 mm

DSR Item No. 11.46.3: (b): Size of Tile 800x800 mm

DSR item No. 11.41A.3.1: Providing and laying Vitrified tiles in floor in different sizes (thickness to be specified by the manufacturer) with water absorption less than 0.08% and conforming to IS:15622, of approved brand & manufacturer, in all colours and shade, laid on 20 mm or more cement mortar 1:4 (1 cement: 4 coarse sand) jointing with grey cement slurry @3.3 kg/sqm including grouting the joints with white cement and matching pigments etc. The tiles must be cut with the zero chipping diamond cutter only . Laying of tiles will be done with the notch trowel, plier, wedge, clips of required thickness, leveling system and rubber mallet for placing the tiles gently and easily.

Glazed Vitrified tiles Matt/Antiskid finish of size

(a) : Size of Tile 600x600 mm

1 Operations as described above in flooring and skirting shall be followed except the tiles shall conform to Table 12 of IS 15622 (Tiles with water absorption E ≤ 0.08 per cent Group BIA) and the joint thickness in flooring shall not be more than 1mm.

2 Rate

The rate for skirting, riser of steps shall include the cost of all materials and labour involved in all the operations described above. Nothing extra shall be paid for the use of cut (sawn) tiles in the work.

Market Rate item (59) : Extra Rates for leaving gap between two tiles in flooring, skirting and wall dado of size 3 mm width and depth up to 6 mm and Grouting the joints of flooring & wall tiles having joints of 3 mm

width, using Epoxy grout mix of 0.70 Kg of organic coated filler of desired shade (0.10 kg of hardener and 0.20 kg of resin per kg) including filling /grouting and finishing complete as per drawing and as directed by Engineer-in-charge.
Size of Tile 300x300 mm

DSR item No. 11.48.2 Extra Rates for leaving gap between two tiles in flooring, skirting and wall dado of size 3 mm width and depth up to 6 mm and Grouting the joints of flooring & wall tiles having joints of 3 mm width, using Epoxy grout mix of 0.70 Kg of organic coated filler of desired shade (0.10 kg of hardener and 0.20 kg of resin per kg) including filling /grouting and finishing complete as per drawing and as directed by Engineer-in-charge.
Size of Tile 600x600 mm

EPOXY BASED GROUTING FOR TILES
Epoxy Grout
Grout is the material that is used to fill the space between adjacent tiles and support the joints. The Epoxy grout consists of mix of 0.70 kg of organic coated filler of desired shade and mixing of 0.10 kg of hardener and 0.20 kg of resin per kg.. They have very low water absorption, higher compressive strength and are resistant to staining and easy to maintain. Epoxy grout is a waterless mix formed by mixing a base material (part A) and a hardener (part B). These components are mixed at site just prior to grouting.

Generally, epoxy grouts require no additional sealer to protect the surface.

Application process

Surface preparation
It shall be ensured that tiles are firmly set and adhesive or mortar is completely dry for 24 hours. All spacers, pegs, ropes and string shall be removed and joints be cleaned by removing free loose dirt particles.

Preparing mix and application
The complete unit Part A (Base) and Part B (Hardener) shall be properly mixed in given ratio. The desired colour of grout shall be obtained by mixing required quantity of colour with base to ensure homogeneity. The grout shall be pressed firmly by using a hard rubber squeeze into joints ensuring that joints are completely filled. Excess grout material shall be removed from joints and surface by moving squeeze on grout line after 22 to 25 minutes. The damp sponge shall be used in circular motion on tile surface to achieve the flush joint. After completion of work the grout haze shall be cleaned with clean water or soap solution. The suitable rubber gloves shall be used to avoid skin contact during application.

Measurement
Length and breadth of grouted tile area shall be measured correct to a cm and the area shall be calculated in sqm correct to two places of decimal.

Rates
The rate shall include the cost of all materials and labour involved in all operations described above. Nothing extra shall be paid.

Market Rate item (60) : Extra Rates for leaving gap between two tiles in flooring, skirting and wall dado of size 3 mm width and depth up to 6 mm and grouting the joints of flooring & wall tiles having joints of 3 mm width, using Cementitious grout mix of 0.70 Kg of organic coated filler of desired shade including filling /grouting and finishing complete as per drawing and as directed by Engineer-in-charge.
(a) : Size of Tile 300x300 mm
Market Rate item (61) (b): Size of Tile 600x600 mm

Material and preparation of Grout:

The grout shall be of approved make, the joints of flooring & wall tiles having joints of 3 mm width, using Cementitious grout mix of 0.70 Kg of organic coated filler of desired shade including filling /grouting and finishing complete as per drawing and as directed by Engineer-in-charge. The storage, handling and placement of the grout must be in strict accordance with the manufacturer's guidelines.

Measurements

Measurements of the grouting work shall be the area of flooring/Dado/skirting which are grouted in Sqm.

Rates shall include all operations of cleaning the joints of all dust, mixing the grout as per manufacturer's specification, filling them in joints and cleaning the surface of floor/dado/skirting after grouting operation.

DSR Item no. 11.44 Crazy ceramic tile flooring, with under layer 12 mm or more thick cement mortar 1:4 (1 cement: 4 coarse sand), with joints not exceeding 5 mm, including filling the gaps with ordinary cement mixture & mixing with synthetic polyester fibre, triangular in shape having specific gravity of 1.34 to 1.40, cross section size ranging from 10 to 40 micron & length upto 6 mm, mixing fibre @ 125 grams per 50 kg of cement in cement mortar, including providing and mixing water proofing material in mortar @ 1 kg per 50 kg of cement, all complete as per direction of Engineer-in-charge. (Alternative item to ceramic glazed tiles 300X300 mm)

General:
The item refers to the provision of china mosaic surface (broken ceramic tile pieces) set in cement mortar over waterproofing treatment well compacted and finished and laid in the required positions with white cement float as mentioned in the item.

Materials:
Broken ceramic tile pieces: These shall be obtained from broken glazed tiles of approved shade and manufacture and conforming to I.S. 13753. The sizes of pieces should be suitable to obtain the correct pattern of flooring as shown on the drawings or as directed by the Engineer-in-charge.

Cement:
Cement in cement float shall be white cement or with coloured pigment as specified in the item.

Mortar Bedding:
12mm or more thick Cement mortar 1: 4 (1 cement : 4 coarse sand) with approved pure acrylic based water-proofing compound bedding shall be laid over the finished brick bat koba or other locations as directed by Engineer-in-charge to the required slopes as shown on the drawings or directed by the Engineer-in-charge.

Broken ceramic Tile Pieces:
These pieces shall be thoroughly wetted before fixing them. White cement grout as required of honey like consistency admixed with approved pure acrylic based water-proofing compound shall be spread over the mortar bedding when the mortar is still plastic. In this cement float glazed tile pieces shall be fixed piece by piece to the pattern as required. The fixing shall be done by keeping the joints between the pieces as thin as possible. The flooring shall be laid to correct level and slopes and compacted by striking the surface with hand thappies and straight screed tamper. The grout shall cream up to the surface. The junctions of the flooring and the parapet wall shall be rounded and the flooring shall be extended up the wall for 15cm or as specified. After the flooring has been laid or the day's fixing work is completed, surplus cement grout that may have come out of the joints on compacting shall be cleaned off. The flooring laid shall be kept moist and allowed to mature undisturbed for 10 days to allow the bedding and flooring to set properly.

Cleaning:
Once the floor has set, it shall be carefully washed clean and dried. When dry, the floor shall be covered with oil free dry saw dust which shall be removed only after the construction work is completed.

Curing:
The entire surface thus treated shall be flooded with water with wet gunny bags for a minimum period of one week.

Measurement:
The length and breadth shall be measured along the rounding up to the top of the edge of the flooring. Area shall be calculated in square meters correct to two places of decimal.

Rate:
The rate shall include all labour, materials, testing, tools and equipment required for the following operations to carry out the item as specified above.

a) Fixing the broken ceramic tile pieces in white cement float on the bedding to the required pattern and compacting
b) Curing
c) Cleaning the floor

Market Rate item (62) : Providing and filling light weight AAC bats (of size 40-60 mm) in required thickness and slope by using insulating material fixed in cement mortar 1:5 like in mass block work including mixing of approved water proofing compound in recommended proportion. The laid brick bat mix shall be well rammed and compacted as required. Rate includes cost of AAC bats, cement mortar, labour charges for working at all levels, leads and heights. For payment the area of sunken slab and the depth of filling shall be measured.

Material
AAC Block wastage shall be used for light weight filling material.

Preparation of Surface and Laying
2.1 Base concrete or the RCC slab on which the filling is to be laid shall be cleaned, wetted and moped.
2.2 Mix the Cement mortar in proportion 1:5. Start putting up solid masonry of AAC block (wastages of AAC block) with cement mortar 1:5. finish the top level of masonry at the sunk filling level with cement mortar screed. The surface is ready to take water proofing treatment/ flooring.

Measurements
Length and breadth and height shall be measured correct to a cm volume calculated in cubic meter correct to two places of decimal.

Rate
The rate for filling shall include the cost of all materials and labour involved in all the operations described above.

SUB HEAD: 11.0

Roofing

Please refer to Relevant Paras for Roofing of CPWD Specifications Volume I – 2019 Page No.569 to 624 (with its latest corrections slips up to the date of submission of the Tender.

ITEM WISE SPECIFICATIONS OF ROOFING

DSR Item No. 12.21.1: Providing gola 75x75 mm in cement concrete 1:2:4 (1 cement: 2 coarse sand: 4 stone aggregate 10 mm and down gauge), including finishing with cement mortar 1:3 (1 cement: 3 fine sand) as per standard design: In 75x75 mm deep chase

Please refer para 12.13 Cement Concrete Gola of CPWD specifications for Civil works 2019 Volume 1.

DSR Item No. 12.22: Making khurras 45x45 cm with average minimum thickness of 5 cm cement concrete 1:2:4 (1 cement: 2 coarse sand: 4 graded stone aggregate of 20 mm nominal size) over P.V.C. sheet 1 m x1 m x 400 micron, finished with 12 mm cement plaster 1:3 (1 cement: 3 coarse sand) and a coat of neat cement, rounding the edges and making and finishing the outlet complete.

Please refer para 12.14 Khurras of CPWD specifications for Civil works 2009 Volume 1.

Market Rate item (63) : Providing and fixing 50 mm diameter and 60 cm long rain water spout in cement mortar 1:4 (1 cement: 4 fine sand). PVC pipe 4 Kg/cm

Preparation: The location for the spout shall be marked accurately as per drawings and approved by the Engineer-in-Charge. Any necessary cutting of brickwork, concrete (chajja, pardi), etc., shall be carefully executed to the required size and depth to receive the spout and fixing materials.

Installation: The PVC pipe spout shall be accurately cut to the specified length of 60 cm. It shall be fixed securely in the prepared opening using the 1:4 cement mortar. The mortar shall be well mixed and compacted around the pipe to ensure a watertight seal.

Alignment: The spout shall be fixed true to level and line, with an adequate slope for proper drainage, as directed by the Engineer-in-Charge.

Finishing: The junction of the spout with the building structure (e.g., roof, chajja) shall be finished neatly with cement mortar and a proper slope provided in the surrounding area to facilitate water flow into the spout. The exposed surface of the spout may be painted with two coats of approved flat oil paint over a coat of primer if specified or directed.

Curing: The cement mortar shall be cured for a minimum period of 7 days after installation.

Testing: The installed drainage system shall be tested under simulated rainfall or by pouring water to ensure no leakage and proper water discharge before final acceptance.

Measurement

The measurement for payment shall be on a per unit (each), including all labour, materials, tools, and incidental charges necessary to complete the work as specified.

Rate

The rate shall be inclusive of the cost of all materials, labour for cutting, fixing, finishing, curing, testing, and all other incidental works to complete the item as per specifications and satisfaction of the Engineer-in-Charge.

Market Rate item (64) :: Providing and fixing 50 mm thick extruded polystyrene rigid insulation board of required size on slab surface, complying with ISO 4898:2008 & ASTM C 578-08b - type VI, having thermal conductivity of 0.0289 W/m K as per ASTM C 578 (measured as per IS 3346), compressive strength of > 350 kPa listed as per ASTM D 1621, density of 34-36 kg/cum as per ASTM D 1622, water absorptions ≤ 1% by volume as per ASTM D 2842, oxygen index of 24.1 to 28.1 listed as per ASTM D 2863, cell size 0.4 mm of dia (max) as per ASTM D 3576. Fire retardant property as per DIN 4102, Part 1 of class B2 and as per ASTM E84 class A, fixed with suitable water based adhesive and fastener, complete in all respect as per the direction of Engineer-in-Charge.

Extruded polystyrene insulation board shall conform to ASTM C 578-08b-type VI requirements.

2 Dimensions: The size of the finished boards shall be 1.25 m × 0.6 m or as per manufacture specifications and having a thickness of 50mm.

The tolerances on length, width and thickness of the finished board shall be ± 2 mm.

3 Sampling & Testing: In a single consignment all the items of the same type, shape and dimensions. Belonging to the same batch of manufacture shall be grouped together to constitute a lot. For the purpose of judging conformity to the requirements each lot shall be considered separately.

Any of the test date obtained on the samples tested fail to conform to the requirements given above, the material shall be rejected.

4 General Methodology:
4.1 Depending upon the span of the roof, a suitable slope should be provided to the roof surface towards a drain so that any rain water accumulation is prevented.
4.2 Waterproofing should be done to the roof prior to application of thermal insulation.
4.3 Surface preparation (level& clean surface) of the roof should be done before installation of XPS boards.
4.4 Ensure that the joints between the rows are staggered. All joints are sealed with a BOPP adhesive tape.
4.5 Covering top of membrane with Geotextile, 120 gsm non-woven, 100% polyester of thickness 1 to 1.25 mm bonded to the membrane with intermittent touch by heating the membrane by Butane Torch as per manufactures recommendation or as specified in item description.
4.6 Cement concrete screed or graded concrete is then applied on the geo textile to cover the surface with the required thickness and slope as directed by engineer in charge.

5 Measurements:
Length and breadth of the roofing insulation shall be measured correct to a cm and the surface area worked out in square metre of the finished work. No deduction shall be made for openings of areas not more than 40 square decimeter. No extra payment will be made for any extra material or labour involved in forming such openings. For openings exceeding 40 square decimeter in area, deduction for the full opening will be made, but nothing extra will be paid for any extra material/labour involved in forming such openings.
6 Rate:
The rate shall include the cost of material and labour in providing and fixing the extruded polystyrene insulation board (as described in general methodology). Geo textile and Screed or graded concrete shall be paid for separately.

DSR Item no. 12.53 Providing and Fixing 15 mm thick densified tegular edged ecofriendly light weight calcium silicate false ceiling tiles of approved texture of size 595 x 595 mm in true horizontal level, suspended on inter locking metal grid of hot dipped galvanized steel sections (galvanizing @ 120 grams per sqm including both side) consisting of main 'T' runner suitably spaced at joints to get required length and of size 24x38 mm made from 0.33 mm thick (minimum) sheet, spaced 1200 mm centre to centre, and cross "T" of size 24x28 mm made out of 0.33 mm (Minimum) sheet, 1200 mm long spaced between main'T' at 600 mm centre to centre to form a grid of 1200x600 mm and secondary

cross 'T' of length 600 mm and size 24 x28 mm made of 0.33 mm thick (Minimum) sheet to be inter locked at middle of the 1200x 600 mm panel to from grid of size 600x600 mm, resting on periphery walls /partitions on a Perimeter wall angle pre-coated steel of size (24x24X3000 mm made of 0.40 mm thick (minimum) sheet with the help of rawl plugs at 450 mm centre to centre with 25 mm long dry wall screws @ 230 mm interval and laying 15 mm thick densified edges calicum silicate ceiling tiles of approved texture in the grid, including, cutting/ making opening for services like diffusers, grills, light fittings, fixtures, smoke detectors etc., wherever required. Main 'T' runners to be suspended from ceiling using G.I. slotted cleats of size 25x35x1.6 mm fixed to ceiling with 12.5 mm dia and 50 mm long dash fasteners, 4 mm G.I. adjustable rods with galvanised steel level clips of size 85 x 30 x 0.8 mm, spaced at 1200 mm centre to centre along main 'T', bottom exposed with 24 mm of all Tsections shall be pre-painted with polyster baked paint, for all heights, as per specifications, drawings and as directed by Engineer-in-Charge. The rate also includes the framing required for trap door in the false ceiling for maintanence purpose.

Please refer para 26.16 of CPWD specifications for Civil works 2019 Volume 2 page 1313 to page 1315.

SUB HEAD: 12.0

Finishing

Please refer to Relevant Paras for Finishing Work of CPWD Specifications Volume II – 2019 Page No 627 to 680 (with its latest corrections slips up to the date of submission of the Tender.

ITEM WISE SPECIFICATIONS OF FINISHING

DSR Item No. 13.4.1: Providing and laying plaster

(A): 12 mm cement plaster of mix: 1:4 (1 cement: 4 coarse sand)

DSR item No. 13.5.1: (b): 15 mm cement plaster on rough side of single or half brick wall of mix: 1:4 (1 cement: 4 coarse sand)

Please refer para 13.1 Cement Plaster 12 mm, 15 mm or 20 mm of CPWD specifications for Civil works 2019 Volume II

DSR Item No. 13.12 : (C) : 18 mm cement plaster in two coats under layer 12 mm thick cement plaster 1:5 (1 cement: 5 coarse sand) and a top layer 6 mm thick cement plaster 1:3 (1 cement : 3 coarse sand) finished rough with sponge.

Please refer para 13.3 18 mm Cement Plaster (two coat work) of CPWD specifications for Civil works 2019 Volume II

DSR Item No 13.78: Providing and applying 12 mm thick (average) premixed formulated one coat gypsum lightweight plaster having additives and light weight aggregates as vermiculite/ perlite respectively conforming to IS: 2547 (Part - 1 & II) 1976, applied on hacked / uneven background such as bare brick/ block/ RCC work on walls & ceiling at all floors and locations, finished in smooth line and level etc. complete.

Please refer para 13.43 18 mm GYPSUM LIGHT WEIGHT PLASTER of CPWD specifications for Civil works 2019 Volume II

DSR Item No 13.79: Extra for addition of synthetic Polyester triangular fiber of length 6 mm, effective diameter 10-40 microns and specific gravity of 1.34 to 1.40 in cement plaster/mortar by using 125 gms. of synthetic Polyester triangular fiber for 50 Kgs. cement used in cement mortar as per directions of Engineer-in-Charge.

1Material

The Recron 3-S polyester fiber of Reliance or its equivalent make @ 125 gm/bag shall be used or Duramesh Concrete Fibrillated Polypropylene Fiber or Monofilament Polypropylene Fiber for Guniting or precasting shall be used.

100% Virgin polypropylene Fibrillated Fiber containing no reprocessed Olefin materials. The fibers shall be used for non – structural, temperature and shrinkage crack reinforcement in hardened concrete. The application rate shall be the minimum recommended dosage rate of 0.1% by volume (.5 lbs per cubic yard /

0.9 kg per cubic meter). The fibers shall be used for the control of cracking due to drying shrinkage and thermal version expansion and contraction, lowered permeability, increased impact capacity, shatter resistance, abrasion resistance and residual strength.

Chemical and Physical Properties

Material-Polypropylene

Specific Gravity-0.91

Fiber Type-Collated Fibrillated

Fiber length-¼", ½", 1" - ½"

Modulus-0.5 (3.5 KN/mm3)2

Absorption-Nil

Melt Point-160-170 degree centigrade

Ignition Point-590 degree centigrade

Alkali Resistance-100% Alkali Proof

Thermal Conductivity-Low

Electrical Conductivity-Low

Acid and Salt Resistance-High

2 Application

The synthetic Polyester triangular fiber shall be continuously stirred in the water so that its consistency is kept uniform throughout, use of this water for preparing mortar mix.

Other details shall be as specified in plastering as they are applicable.

3Measurement

It shall be measured correct to no 12.5 gm pouch Per Bag of 50 Kg of cement bag.

4Rate

The rate shall include all material and labour involved in all the operations described above with tools and scaffolding.

DSR Item no. 13.31.1: Pointing on brick work or brick flooring on non-Modular bricks with cement mortar 1:3 (1 cement: 3 fine sand)

(a): Flush / Ruled/ Struck or weathered pointing on bricks of size 230 mm x 110 mm x 70 mm

DSR Item no. 13.31.1: (b): Raised and cut pointing

DSR no. 13.33.1: Pointing on stone work with cement mortar 1:3 (1 cement: 3 fine sand):

(a) : Flush/ Ruled pointing

DSR Item no. 13.33.2: (b): Raised and cut pointing

Please refer para 13.13 Cement Plaster (two coat work) of CPWD specifications for Civil works 2019 Volume II

DSR item no. 13.37.1: White washing with lime to give an even shade: New work (three or more coats)

Please refer para 13.14 White washing with lime of CPWD specifications for Civil works 2019 Volume II

DSR Item no. 13.80 : Providing and applying white cement based putty of average thickness 1 mm, of approved brand and manufacturer, over the plastered wall surface to prepare the surface even and smooth complete.

1 Materials

Cement based putty of approved brand and manufacture shall be used. Only ready mixed putty as received from the manufacturer without any admixture shall be used.

2 Commencing Work

Cement based putty shall not be started until the Engineer-in-Charge has inspected the items of work to be painted, satisfied himself about their proper quality and given his approval to commence the painting work. Cement based putty shall generally be taken in hand after practically finishing all other building work. The rooms should be thoroughly swept out and the entire building cleaned up, at least one day in advance of the Putty work being started.

3 Preparation of Surface

The surface shall be thoroughly cleaned and dusted off. All rust, dirt, scales, smoke splashes, mortar droppings and grease shall be thoroughly removed before painting is started. The prepared surface shall have received the approval of the Engineer-in-Charge after inspection, before painting is commenced.

4 Application

Before starting painting work order to achieve a superior finished surface, putty/ paste fillers shall be used on, all surfaces to be painted to fill pores, dents etc. The putty/paste fillers shall be approved quality and manufacture and shall be applied to the surface with a knife or other sharp edged tool after the priming coat as well after each under coat. The surface, after filling with putty/paste filler, shall be rubbed down with fine paper and dusted off before the application of the subsequent coat. Paste wood filler when set shall be wiped across the grain of the wood and then with the grain to secure a clean surface. Surface to be stained shall be covered with a uniform coat of stain wiped off if required. Each coat shall be allowed to dry completely and lightly rubbed with fine grade pumice stone sand paper before next coat is applied. Each coat shall vary in shade and well approved to Engineer in charge.

5 The specifications in respect of scaffolding, protective measures, measurements and rate shall be as described in painting.

DSR Item no. 13.85.1: Applying priming coats with primer of approved brand and manufacture, having low VOC (Volatile Organic Compound) content.

(a) : With ready mixed pink or grey primer on wood work (hard and soft wood) having VOC content less than 50 grams/ liter

DSR Item no. 13.85.3 (c) : With water thin able cement primer on wall surface having VOC content less than 50 grams/liter.

Please refer to para 13.24 regarding primer activities of CPWD specifications 2019 volume II.

DSR Item no. 13.44.1: Finishing walls with water proofing cement paint of required shade: New work (Two or more coats applied @ 3.84 kg/10 sqm)

Please refer para 13.21 Cement Paint of CPWD specifications for Civil works 2019 Volume II

DSR Item no. 13.83.2: Wall painting with premium acrylic emulsion paint of interior grade, having VOC (Volatile Organic Compound) content less than 50 grams/ liter of approved brand and manufacture, including applying additional coats wherever required to achieve even shade and colour. Two coats

Please refer para 13.31 Plastic Emulsion Paint of CPWD specifications for Civil works 2019 Volume II. All specifications shall be same as for Plastic

Emulsion paint except that Premium Acrylic Emulsion paint shall be used in place of Plastic Emulsion paint.

DSR item no. 13.84.2: Painting with synthetic enamel paint, having VOC (Volatile Organic Compound) content less than 150 grams/ liter, of approved brand and manufacture, including applying additional coats wherever required to achieve even shade and colour. Two coats

Please refer para 13.32 Painting with Synthetic enamel Paint of CPWD specifications for Civil works 2019 Volume II.

DSR item no. 13.46.1: Finishing walls with Acrylic Smooth exterior paint of required shade: New work (Two or more coat applied @ 1.67 ltr/10 sqm over and including priming coat of exterior primer applied @ 2.20 kg/ 10 sqm)

Please refer para 13.22 Exterior Painting on wall of CPWD specifications for Civil works 2019 Volume II. All the specifications shall be same per para 13.22 and Acrylic smooth exterior paint shall be used.

DSR item no. 13.52.1: Finishing with Epoxy paint (two or more coats) at all locations prepared and applied as per manufacturer's specifications including appropriate priming coat, preparation of surface, etc. complete. On steel work

1Material

Epoxy Paint shall be (conforming to IS 2339) of approved brand and manufacture. The Paint comes in compact dual container with the paste and the medium separately. The two shall be mixed together to proper consistency before use.

2Preparation of Surface

All rust and scales shall be removed by scraping or brushing with steel wire brushes and then smoothened with sand paper. The surface shall be thoroughly cleaned of dust.

3Application

The number of coats to be applied shall be as given in the item. Each coat shall be allowed to dry for 24 hours and lightly rubbed down with fine grade sand paper and dusted off before the next coat is applied. The finished surface shall present an even and uniform appearance.

As paste is likely to settle in the container, care shall be taken to frequently stir the Paint during use. Also the Paint shall be applied and laid off quickly, as surface is otherwise not easily finished.

Other details, measurements and rates shall be as specified in painting.

DSR item No. 13.114 Providing and applying Melamine polishing including preparation of surface and staining to the approved colour and shade as per the manufacturers specifications including scaffolding, curing, cleaning the surfaces and other incidental work to be done etc. complete at all floors for any height as directed by engineer in charge.

Please refer para 13.37A Painting of Melamine polish of CPWD specifications for Civil works 2019 Volume II.

Market Rate item (64) : Providing and applying breathable, non-reactive, antifungal, and water repellant Silane/ Siloxane chemical as approved by Engineer-in-charge, of approved brand and manufacture, diluted with solvent mineral Turpentine oil in the ratio of 1:12 (One part of approved chemical :12 Part of Turpentine oil), on the existing stone masonry surface or Stone cladding or RCC surfaces with two or more coats to give uniform application of chemical on the surface, including scaffolding, curing, cleaning the surfaces and other incidental work to be done etc. complete at all levels as directed by engineer in charge.

Please refer para 24.8 Application of sealer of CPWD specifications for Civil works 2019 Volume II.

Market Rate item (65) : Extra for expose shuttering over ordinary shuttering for exposed concrete elements using special sized of approved quality steel plates formwork / 12 mm waterproof plywood formwork / wood grain finish formwork with definite pattern as per approved drawing, Including providing and fixing necessary sleeves, grooves & Drip moulds for all shapes, at all levels and as directed by engineer in charge. Same kind of shuttering material should be used for standard and residual sizes. (no separate payment for small qty. in Metre)(waffle slab will not be considered in this item)

Please refer para 5.2 Form work of CPWD specifications for Civil works 2019 Volume II.

Formwork Material Specifications

The formwork material must be of approved quality and suitable for producing an exposed, high-quality concrete finish as per the approved drawings.

- Approved Quality Steel Plates Formwork: Steel panels should be rigid, free from dents, distortions, and rust. Joints between panels must be watertight, typically using rubber or foam beading, to prevent slurry leakage and ensure a smooth, uniform surface. The surface should be treated with an approved release agent that does not stain the concrete.

- 12 mm or more thick Waterproof Plywood Formwork: The plywood must be BWP (Boiling Water Proof) grade, ISI marked (e.g., IS 710 or IS 4990 for concrete formwork). It should have a smooth, film-faced finish to ensure a mirror-like concrete surface. The thickness shall be 12 mm or more as specified, and the panels should be free of defects. The plywood is generally restricted to a certain number of reuses (e.g., maximum four per side) to maintain the required finish quality.

- Wood Grain Finish Formwork: Special textured form liners (e.g., rubber or plastic mats) shall be used to impart the specific wood grain pattern shown in the approved drawings. These liners must be securely fixed to the primary formwork to ensure a consistent and definite pattern across the entire exposed surface.

Finish and Dimensional Control

- Exposed Surface Finish: The formwork must produce a high-quality finish suitable for exposed concrete elements. This typically means a smooth, dense, and uniform surface, free from honeycombing, blowholes, or blemishes. Any minor imperfections or patches shall be repaired with an approved filler in cement mortar (1:1 mix) and rendered to give a smooth surface, whenever required and as directed by the Engineer-in-Charge.

- Dimensional Accuracy: Shuttering must be erected accurately to line, level, and plumb, conforming precisely to the dimensions, shapes, and patterns of formwork panels as detailed in the approved drawings.

Ancillary Items and Inclusions

- Sleeves, Grooves, and Drip Moulds: Providing and fixing necessary sleeves, grooves, and drip moulds of all shapes and sizes, at all levels, is included in the scope of work and the quoted rate. These elements should be accurately formed using rubber or timber inserts securely fixed inside the formwork to ensure clean, sharp lines in the finished concrete.

- Work at All Heights/Levels: The quoted rate for shuttering shall be inclusive of all labour, materials, tools, and scaffolding required for execution at all heights, levels, and situations.

Measurement and Payment Clauses

- Uniform Material Usage: The same kind of shuttering material used for standard sized panels must also be used for residual and small quantity areas to ensure a uniform finish throughout the project.

- No Separate Payment for Small Quantities: No separate or extra payment will be made for small quantity work in linear or square meters; this work is considered incidental to the main item and included in the overall rate.

- Engineer-in-Charge Approval: All work, materials, and finished surfaces are subject to the inspection and approval of the Engineer-in-Charge, whose decision is final and binding

SUBHEAD: 13.0
WATERPROOFING WORK

Please refer to Relevant Paras for Water proofing Work of CPWD Specifications Volume II – 2019 Page No.1161 to 1206 (with its latest corrections slips up to the date of submission of the Tender.

ITEM WISE SPECIFICATIONS OF WATERPROOFFINISHING

DSR Item No. 22.4.1 : Providing and Placing in position suitable PVC water stops conforming to IS:12200 for construction/ expansion joints between two RCC members and fixed to the reinforcement with binding wire before pouring concrete etc. complete :

(a) : Serrated with central bulb (225 mm wide, 8-11 mm thick)

Please refer para 22.4 Providing Water Stops of CPWD specifications for Civil works 2019 Volume II.

Water stop shall be measured in length in running meter.

DSR Item no. 22.6: Providing and laying water proofing treatment on roofs of slabs by applying cement slurry mixed with water proofing cement compound consisting of applying: a) after surface preparation, first layer of slurry of cement @ 0.488 Kg/Sqm mixed with water proofing cement compound @ 0.253 Kg/Sqm. b) laying second layer of Fiber glass cloth when the first layer is still green. Overlaps of joints of fiber cloth should not be less than 10 cm. c) third layer of 1.5 mm thickness consisting of slurry of cement @ 1.289 Kg/Sqm mixed with water proofing cement compound @ 0.670 Kg/Sqm and coarse sand @ 1.289 Kg/Sqm. This will be allowed to air cure for 4 hours followed by water curing for 48 hours. The entire treatment will be taken up to 30 cm on parapet wall and tucked into groove in parapet all around. d) Fourth and final layer of brick tiling with cement mortar (which will be paid for separately. For the purpose of measurement the entire treated surface will be measured.

Please refer para 22.3 22.5, and 22.6 Integral water proofing treatment to UG and overhead water Tanks, and Water proofing treatment to sunken portion of WC, Bath etc. of CPWD specifications for Civil works 2019 Volume II. This Item shall be operated for water proofing of sunken slab horizontal and vertical surfaces, water proofing of UG and Overhead tanks and the sloping roofs etc. Water proofing shall be guaranteed against leakage for a period of 10 years from the date of final completion of the project.

DSR Item No. 22.7.1 : Providing and laying integral cement based water proofing treatment including preparation of surface as required for treatment of roofs, balconies, terraces etc. consisting of following operations: a) Applying a slurry coat of neat cement using 2.75 kg/sqm of cement admixed with water proofing compound conforming to IS. 2645

and approved by Engineer-in-charge over the RCC slab including adjoining walls up to 300 mm height including cleaning the surface before treatment. b) Laying brick bats with mortar using broken bricks/brick bats 25 mm to 115 mm size with 50% of cement mortar 1:5 (1 cement : 5 coarse sand) admixed with water proofing compound conforming to IS : 2645 and approved by Engineer-in-charge over 20 mm thick layer of cement mortar of mix 1:5 (1 cement :5 coarse sand) admixed with water proofing compound conforming to IS : 2645 and approved by Engineer-in-charge to required slope and treating similarly the adjoining walls up to 300 mm height including rounding of junctions of walls and slabs c) After two days of proper curing applying a second coat of cement slurry using 2.75 kg/ sqm of cement admixed with water proofing compound conforming to IS : 2645 and approved by Engineer-in-charge. d)Finishing the surface with joint less cement mortar of mix 1:4 (1cement :4 coarse sand) admixed with water proofing compound confirming to IS 2645 and approved by Engineer - in - Charge including finishing the top surface with boom finish to receive subsequent finishing layer complete. The whole terrace so finished shall be flooded with water for a minimum period of two weeks for curing and for final test. All above operations to be done in order and as directed and specified by the Engineer - in-Charge.

With average thickness of 120 mm and minimum thickness at khurra as 65 mm.

Please refer para 22.6 and 22.7 Integral water proofing treatment of roof slabs of CPWD specifications for Civil works 2019 Volume II. This Item shall be operated for water proofing of horizontal surfaces of roof slab. Rate includes for providing slope in the treatment as per details drawings and as directed by the Engineer - in- Charge. Rate also include providing water proofing treatment up to 300 mm height of adjoining parapet wall on the roof. Water proofing shall be guaranteed against leakage for a period of 10 years from the date of final completion of the project.

Measurements shall be taken for surface area of terrace in plan only. No separate payment for treatment to 300 mm high returns on parapet wall shall be made,

DSR Item No. 22.14.1: Grading roof for water proofing treatment with Cement concrete 1:2:4 (1 cement: 2 coarse sand: 4 graded stone aggregate 20 mm nominal size)

Please refer para 22.9 Grading roof with Cement Concrete 1:2:4 of CPWD specifications for Civil works 2019 Volume II. Alternatively additional thickness provided in Brick bat Koba more than 120 mm average thickness in item 22.71 above shall also be paid under this item.

DSR Item No. 22.20.1: Providing and laying APP (Atactic Polypropylene Polymer) modified prefabricated five layer 3 mm thick water proofing membrane, black finished reinforced with non-woven polyester matt consisting of a coat of bitumen primer for bitumen membrane @ 0.40 litre/sqm by the same membrane manufacture of density at 25°C, 0.87-0.89 kg/ litre and viscosity 70-160 cps. Over the primer coat the layer of membrane shall be laid using Butane Torch and sealing all joints etc., and preparing the surface complete. The vital physical and chemical parameters of the membrane shall be as under: Joint strength in longitudinal and transverse direction at 23°C as 650/450N/5cm. Tear strength in longitudinal and transverse direction as 300/250N. Softening point of membrane not less than 150°C. Cold flexibility shall be upto -2°C when tested in accordance with ASTM, D - 5147. The laying of membrane shall be got done through the authorized applicator of the manufacturer of membrane: 3 mm thick

Please refer para 14.49 of chapter on Repairs to Buildings - Water Proofing treatment with APP (Atactic Polypropylene Polymeric) Membrane of CPWD specifications for Civil works 2019 Volume II.

DSR Item no. 22.21 : Extra for covering top of membrane with Geotextile, 120 gsm non-woven, 100% polyester of thickness 1 to 1.25 mm bonded to the membrane with intermittent touch by heating the membrane by Butane Torch as per manufactures recommendation.

Please refer para 14.51 of chapter on Repairs to Buildings Extra for covering top of Atactic Polypropylene Polymer modified prefabricated membrane with Geotextile of CPWD specifications for Civil works 2019 Volume II.

SUBHEAD: 14.0
DISMENTALING WORK

Please refer to Relevant Paras for Water proofing Work of CPWD Specifications Volume II – 2019 Page No.733 to 741 (with its latest corrections slips up to the date of submission of the Tender.

ITEM WISE SPECIFICATIONS OF DISMENTALING

DSR RA NO. (66): Dismantling of Reinforced cement concrete work to any depth and width, any shape, making gap or hole at all level, removal of debris, disposing the same away from the site to authorized dumping ground, loading and unloading, making the surface good etc. complete. Rate shall include for cutting of rods to any dia, dismantling of Reinforced cement concrete by manually/ mechanical means with necessary tools and plants, scaffolding, water and power charges, cleaning the surface, preparation of surface etc. Rate shall include for stacking the serviceable materials and disposing the unserviceable material/debris away from the site by mechanical mean including loading, unloading, cleaning the site etc. complete as directed.

DSR RA NO. (67): Dismantling of brickwork including plastering/pointing to any depth and width, at all levels including removal of debris, disposing the same away from the site, loading and unloading, making the surface good etc. complete. Rate shall include for dismantling of brick including plastering/pointing, removal of debris by manual/ mechanical means with necessary tools and plants, scaffolding, water and power charges, cleaning the surface, preparation of surface. Rate shall include for stacking the serviceable materials and disposing the un serviceable materials/debris away from the site by mechanical means including loading , unloading, cleaning the site etc. complete as directed.

DSR Item no. 15.12.1 : Dismantling doors, windows and clerestory windows (steel or wood) shutter including chowkhats, architrave, holdfasts etc. complete and stacking within 50 metres lead : Of area 3 sq. metres and below.

DSR RA NO. (68): Dismantling of any type of tile work including backing coat for dado and subbase for floor of any thickness in floors and roofs laid in cement mortar including stacking material out of the site to authorized dumping ground.

DSR RA NO. (69): Dismantling stone slab flooring , cladding etc.laid in cement mortar including stacking of serviceable material and disposal of unserviceable material within 50 metres lead.

DSR Item no. 15.5 : Extra for cutting reinforcement bars manually/ by mechanical means in R.C.C. or R.B. work (Payment shall be made on the cross sectional area of R.C.C. or R.B. work) as per direction of Engineer-in-charge.

DSR Item no. 26.29 : Cleaning of reinforcement from rust from the reinforcing bars to give it a total rust free steel surface by using alkaline chemical rust remover of approved make with paint brush and removing loose particles after 24 hours of its application with wire brush and thoroughly washing with water and allowing it to dry, all complete as per direction of Engineer-In-Charge.

DSR Item no. 26.29.1 : Bars upto 12 mm diameter

DSR Item no. 26.29.2 : Bars above 12 mm diameter

Market Rate Item No. (70) : Providing and applying rust converter on cleaned reinforcement bars in R.C.C. or R.B. work as per direction of Engineer-in-charge.

Dismantling works shall be carried out as specified generally in the relevant chapter on Dismantling works of CPWD specifications 2019 Volume 2.

All materials obtained from dismantling or demolition shall be the property of the Government unless otherwise specified and shall be kept in safe custody until they are handed over to the Engineer-in Charge/ authorized representative.

The demolition shall always be well planned before hand and shall generally be done in reverse order of the one in which the structure was constructed. The operations shall be got approved from the Engineer-in-Charge before starting the work.

Due care shall be taken to maintain the safety measures prescribed in IS 4130 and construction and demolition waste management rules 2016 shall be followed.

Necessary propping, shoring and or under pinning shall be provided to ensure the safety of the adjoining work or property before dismantling and demolishing is taken up and the work shall be carried out in such a way that no damage is caused to the adjoining work or property. Wherever specified, temporary enclosures or partitions and necessary scaffolding with suitable double scaffolding and proper cloth covering shall also be provided, as directed by the Engineer-in-Charge. It shall be ensured that no dust is generated while demolishing. Demolition Rules – 2016 shall be followed.

Necessary steps shall be taken to keep noise and dust nuisance to the minimum. All work needs to be done under the direction of Engineer-in-Charge. Helmets, goggle, safety belts etc., should be used whenever required and as directed by the Engineer-in-Charge. The demolition work shall be proceeded with in such a

way that it causes the least damage and nuisance to the adjoining building and the public. Barricading shall be provided as per NGT guidelines.
Dismantling shall be done in a systematic manner. All materials which are likely to be damaged by dropping from a height or by demolishing roofs, masonry etc. shall be carefully removed first. Chisels and cutters may be used carefully as directed. The dismantled articles shall be removed manually or otherwise, lowered to the ground (and not thrown) and then properly stacked as directed by the Engineer-in-Charge.

Where existing fixing is done by nails, screws, bolts, rivets, etc., dismantling shall be done by taking out the fixing with proper tools and not by tearing or ripping off.

Any serviceable material, obtained during dismantling or demolition, shall be separated out and stacked properly as directed by the Engineer-in-Charge within a lead of 50 meters. All unserviceable materials, rubbish etc. shall be disposed off at authorized locations by urban local bodies as directed by the Engineer-in-Charge.

The contractor shall maintain/disconnect existing services, whether temporary or permanent, wherever required by the Engineer-in-Charge.

Water spray shall be used to reduce dust while tearing down plaster from brick work.

Safety belts shall be used by labourers while working at higher level to prevent falling from the structure. Wherever, possible mechanized working platform shall be used.

First-aid equipment shall be made available at all demolition works of any magnitude

MEASUREMENTS

All work shall be measured net in the decimal system, as fixed in its place, subject to the following limits, unless otherwise stated hereinafter.
(a) Dimensions shall be measured correct to a cm.
(b) Areas shall be worked out in sqm correct to two places of decimal.
(c) Cubical contents shall be worked out to the nearest 0.01 cum

Measurements of all work except hidden work shall be taken before demolition or dismantling and no allowance for increase in bulk shall be allowed.

Rates

The rate shall include the cost of all labour involved and tools used in demolishing and dismantling including scaffolding. The rate shall also include the charges for

separating out and stacking the serviceable material properly and disposing off unserviceable material within a distance of 50 meters.

The rate shall also include for temporary shoring for the safety of portions not required to be pulled down, or of adjoining property, and providing temporary enclosures or partitions, where considered necessary.

SUBHEAD: 14.0
EXTERNAL DEVELOPMENT WORK

Please refer to Relevant Paras for Water proofing Work of CPWD Specifications Volume II – 2019 Page No.757 to 875 (with its latest corrections slips up to the date of submission of the Tender.

ITEM WISE SPECIFICATIONS OF EXTERNAL DEVELOPMENT WORKS

DSR Item no. 16.75 : Trimix flooring

Providing and laying C.C. pavement of mix M-25 with ready mixed/ batch mixed concrete (with use of PP cement) from batching plant with floor hardener (as per manufacturer specification). The ready mixed concrete shall be casted in panel and finished with screed board vibrator, vacuum dewatering process and finally finished by floating, brooming with machine, etc. complete as per specifications and directions of Engineer in charge. If trimix concrete shall be laid over on existing concrete surface, bonding agent shall be applied before laying of concrete. Reinforcement if required shall be paid in relevant tender item. The rate shall include cutting of grooves and filling them with poly sulphide sealant and backer rod.

Refer to para 16.37 for the relevant portion of cement concrete paving under the controlled conditions.

Concrete mix shall be M25 Design mix with the use of Portland pozzolana cement.

All side forms shall be of mild steel. The steel forms shall be of M.S. Channel sections and their depth shall be equal to the thickness of the pavement. Bracing and supports must be ample to prevent the springing of forms under pressure of concrete or weight or thrust of the machinery (like screed vibrator) operating on the forms. Support to the forms shall be sufficiently rigid to hold them in position during the entire operation of laying and compacting and finishing of concrete pavement.

Compaction shall be carried out by electrically (or) diesel operated needle and screed vibrators as stipulated hereafter.

After the leveling of concrete with screed vibrator, excess water shall be removed from the concrete with the vacuum dewatering pump.

Concreting shall be carried out in one operation between the expansion joints and construction joints without any break at the dummy joints. During compaction, any low or high spots shall be made up by adding or removing concrete. After longitudinal floating has been completed but while concrete is still plastic, the slab surface shall be tested for trueness with a 3 m straight edge. Any depressions or high spots showing departure from the true surface shall be immediately rectified.

When the concrete is still green, brooming shall be done on the concrete surface if the same is required to be done for making the surface non skidding.

Concrete under this item shall be measured and paid for in volume of the laid concrete in Cum.

DSR Item no. 16.79 : Providing, laying, spreading and compacting graded stone aggregate (size range 53 mm to 0.075 mm) to wet mix macadam (WMM) specification including premixing the material with water at OMC in for all leads & lifts, laying in uniform layers with mechanical paver finisher in sub- base / base course on well prepared surface and compacting with vibratory roller of 8 to 10 tonne capacity to achieve the desired density, complete as per specifications and directions of Engineer-in-Charge.

Scope

This work shall consist of laying and compacting clean, crushed, graded aggregate and granular material, premixed with water, to a dense mass on a prepared subgrade/sub -base/base or existing pavement as the case may be in accordance with the requirements of these Specifications. The material shall be laid in one or more layers as necessary to lines, grades and cross -sections shown on the approved drawings or as directed by the Engineer.

The thickness of a single compacted Wet Mix Macadam layer shall not be less than 75 mm. When vibrating or other approved types of compacting equipment arc used, the compacted depth of a single layer of the sub-base course may be increased to 200 mm upon approval of the Engineer

Coarse aggregates: shall be crushed stone. If crushed gravel/shingle is used, not less than 90 per cent by weight of the gravel/shingle pieces retained on 4,75 mm sieve shall have-at least two fractured faces. The aggregates shall conform to the physical requirements set forth in Table 400 -10 of Morth Specifications

GRADING REQUIREMNTS OF AGGREGATES FOR WET MIX MACADAM

IS Sieve Designation	Per cent by weight passing the IS sieve
53mm	100
45 mm	95-100
26.5 mm	60-80
11.2 mm	40-60
4.75 mm	25-40
2.36 mm	15-30
600 micron	8-22
75 micron	0-8

Materials finer than 425 micron shall have Plasticity Index (PI) not exceeding 6. The final gradation approved within these limits shall be well graded from coarse to fin and shall not vary from the low limit on one sieve to the high limit on the adjacent sieve or vice versa.

Preparation of mix : Wet Mix Macadam shall be prepared in an approved mixing plant of suitable capacity having provision for controlled addition of water and forced/positive mixing arrangement like pugmill or pan type mixer of concrete batching plant. For small quantity of wet mix work, the Engineer may permit the mixing to be done in concrete mixers.

Optimum moisture for mixing shall be determined in accordance with IS:2720 (Part -8) after replacing the aggregate fraction retained on_22A mm sieve with material of 4.75 mm to 22.4 mm size. While adding water, dup allowance should be made for evaporation losses.

However, at the time of compaction, water in the wet mix should not vary from the optimum value by more than agreed limits. The mixed material should be uniformly wet and no segregation should be permitted.

Spreading of mix : Immediately after mixing, the aggregates shall be spread uniformly and evenly upon the prepared subgrade/sub- base/base in required quantities. In no case should these be dumped in heaps directly on the area where these are to be laid nor shall their hauling over a partly completed stretch be permitted.

The mix may be spread either by a payer finisher or motor grader. For portions where mechanical means cannot be used, manual means as approved by the Engineer shall be used. The motor grader shall be capable of spreading the material uniformly al! over the surface. Its blade shall have hydraulic control suitable for initial adjustments and maintaining the same so as to achieve the specified slope and grade.

Compaction: After the mix has been laid to the required thickness, grade and crossfall/camber the same shall be uniformly compacted, to the full depth with suitable roller. If the thickness of single compacted layer does not exceed 100 mm, a smooth wheel roller of 80 to 100 kN weight may be used. For a compacted single layer upto 200 mm, the compaction shall be done with the help of vibratory roller of minimum static weight of 80 to 100 kN or equivalent capacity roller. The speed of the roller shall not exceed 5 km/h.

Measurements : Measurements of the Wet Mix Maccadam shall be in Volume and shall be pais in Cum. Of the Compacted volume of WMM.

DSR Item no. 16.79 : Preparation and consolidation of sub grade with power road roller of 8 to 12 tonne capacity after excavating earth to an average of 22.5 cm depth, dressing to camber and consolidating with road roller including making good the undulations etc. and re-rolling the sub grade and disposal of surplus earth with lead up to 50 metres.

Refer to para 16.2 of the CPWD specifications for Road work Volume 2 od CPWD Specifications.

Measurements

The lengh and width shall be measured correct to a cm. The area shall be worked out in square metre, correct to two places of decimal.

Rate

The rate for preparation and consolidation of sub grade shall include the cost of materials and labour involved for all the operations mentioned in above unless otherwise specified.

DSR Item no. 16.79 : Providing and laying tactile tile (for vision impaired persons as per standards) of size 300x300x9.8mm having with water absorption less than 0.5% and conforming to IS: 15622 of approved make in all colours and shades in for outdoor floors such as footpath, court yard, multi modals location etc., laid on 20mm thick base of cement mortar 1:4 (1cement : 4 coarse sand) in all shapes & patterns including grouting the joints with white cement mixed with matching pigments etc. complete as per direction of Engineer-in-Charge.

DSR Item no. 16.78.1 : Construction of granular sub-base by providing close graded Material conforming to specifications, mixing in a mechanical mix plant at OMC, carriage of mixed material by tippers to work site, for all leads & lifts, spreading in uniform layers of specified thickness with motor grader on prepared surface and compacting with vibratory power roller to achieve the desired density, complete as per specifications and directions of Engineer-in-Charge.With material conforming to Grade-I (size range 75 mm to 0.075 mm) having CBR Value-30

Refer to para 16.2 for the specifications of Granular sub base of the CPWD specifications 2019 Volume 2.

Measurements

Granular sub-base shall be measured as finished work in position in cubic metres. The length and breadth shall be measured to the nearest centimetre. The depth of consolidated layer shall be computed to nearest half centimetre by taking average of depths at the centre and at 30 cm from the left and right edges at a cross section taken at 100 metre interval or less as decided by the Engineer-in-Charge by making small pits. The consolidated cubical contents shall be calculated in cubic metres correct to two places of decimal. The protection of edges of granular sub-base extended over the full formation as shown in the drawing shall be considered incidental to the work of providing granular sub-base and as such no extra payment shall be made for the same.

Rate

The Contract unit rate for granular sub-base shall be payment in full for carrying out the required operations including all labour, tools, equipment, machinery and incidentals to complete the work to the specifications as described above.

DSR Item no. 16.8 : Construction of dry lean cement concrete sub base over a prepared sub-grade with coarse and fine aggregate conforming to IS:383, the size of coarse aggregate not exceeding 25 mm, aggregate cement ratio not to exceed 15:1, aggregate gradation after blending to be as per specifications, cement content not to be less than 150 Kg/cum, optimum moisture content to be determined during trial length construction, concrete strength not to be less than 10 Mpa at 7 days, mixed in a batching plant, transported to site, for all leads & lifts, laid with a mechanical paver, compacting with 8-10 tonne vibratory roller, finishing and curing etc. complete as per direction of Engineer-in-charge.

Refer to relevant Para 4.1 and para 4,2 of Concrete specification of CPWD specifications 2019 Volume 1. Dry Lean concrete shall be used for sub base to Tremix Road Concrete or Pavement Quality concrete in Concrete Road works.

1.0 MATERIAL

Water, cement, fine aggregate or sand, surkhi, and fly ash, coarse aggregates shall be as specified in detailed specifications of Concrete works.

2.0 Proportions:

Concrete shall be classified by different proportions of Cement: Fine aggregate: Coarse Aggregate as per respective Design Mix Minimum cement content for different design mix shall be as per individual mix.

3.0 The measurements shall be in Cum.

4.0 The rates shall include all the cost of all materials, labour for all operations of mixing, placing, finishing and curing of concrete and all the equipment required for the work.

DSR Item no. 16.8 : Providing and laying at or near ground level factory made kerb stone of M-25 grade cement concrete in position to the required line, level and curvature, jointed with cement mortar 1:3 (1 cement: 3 coarse sand), including making joints with or without grooves (thickness of joints except at sharp curve shall not to more than 5mm), including making drainage opening wherever required complete etc. as per direction of Engineer-in-charge (length of finished kerb edging shall be measured for payment). (Precast C.C. kerb stone shall be approved by Engineer-in-charge).

Kerb stones shall have to be manufactured at factory. Kerb stones shall be made out of M 25 concrete, the size and shape of the kerb stones shall be as per detailed drawings. The kerb stones shall be approved by the Architect and the Engineer in Charge before procurement.

Kerb stones shall be measured by the volume of concrete in Cum.

Rate of kerb stones includes all operations of procurement, transportation, laying in true line, level and grade, pointing the joints with cement mortar etc. complete.

DSR Item no. 16.8 : Painting road surface marking with adequate nos of coats to give uniform finish with ready mixed road marking paint conforming to IS : 164, on bituminous surface in white/yellow shade, including cleaning the surface of all dirt, scales, oil, grease and foreign material etc. complete.

Refer to 16.41 and 16.42 of Road works in CPWD Specifications 2019 Volume 2.

The area of Painting of Road markings shall be measured in sqm.

DSR Item no. 16.8 : Providing and applying 2.5 mm thick road marking strips (retroreflective) of specified shade/ colour using hot thermoplastic material by fully/ semi automatic thermoplastic paint applicator machine fitted with profile shoe, glass beads dispenser, propane tank heater and profile shoe heater, driven by experienced operator on road surface including cost of material, labour,T&P, cleaning the road surface of all dirt, seals, oil, grease and foreign material etc. complete as per direction of Engineer-in-charge and accordance with applicable specifications.

Refer to 16.41 and 16.42 of Road works in CPWD Specifications 2019 Volume 2.

The area of Painting of Road markings shall be measured in sqm.

DSR Item no. 16.91.2 : Providing and laying factory made chamfered edge Cement Concrete paver blocks of required strength, thickness & size/shape, made by table vibratory method, to attain superior smooth finish using PU or equivalent moulds, laid in required Grey colour & pattern over 50mm thick compacted bed of coarse sand, compacting and

proper embedding / laying of inter locking paver blocks into the sand bedding layer through vibratory compaction by using plate vibrator, filling the joints with jamuna sand and cutting of paver blocks as per required size and pattern, finishing and sweeping extra sand in footpath, parks, lawns, drive ways or light traffic parking etc. all complete as per manufacturer's specifications & direction of Engineer -in-Charge:

(a)80 mm thick c.c. paver block of M-35 grade with approved color design and pattern.

(b)

Material

Concrete Pavers For pedestrian areas, should be Precast and cured paver blocks of 60mm thickness, ±2mm tolerance in dimensions and flatness, min. compressive strength 300 kg/sq cm, made from materials conforming to IS standards.

Sand Bedding

Sand bedding of 50 mm or more if required shall be done over compected sub grade. This sand material shall be naturally occurring sand or shall obtained by crushing natural hard stone and free from impurities.. It shall comply in all respects with relevant Indian Standards or MORTH code and be well graded down from 5mm. The moisture content of the laying course should be as uniform as possible and at or about its optimum. Where material is to be stockpiled it should be covered. The laying course should be such that, after compaction, it forms a nominally uniform layer, 50mm thick or more if required, below the pavers. It shall be laid in accordance with either of the following alternative methods: - The material should be spread loose in a uniform layer and screeded to a thickness required to give nominal 50mm layer after completion of the paving. OR The material should be spread in a loose, uncompacted layer to approximately 2/3 of the required final thickness. This layer should be lightly compacted by means of a vibrating plated compactor. A further layer of loose material should be spread and screeded to create a loose surface on to which the units can be placed. Care should be taken to avoid localized disturbance of the prepared laying course sand by pedestrian or wheeled traffic prior to placing units. The area of laying course prepared should be such that the position of its boundary is not more than one meter from the position of the lying face at the end of the working period wherever practicable.

Joints in Flexible Paving Joints are to be 2mm when placed hand-tight. Pavers shall be laid working from an existing laying face edge or edge restraint. Full pavers should be laid first; closure units should then be laid. The area to be laid should be completed as far as is possible in entire paver units. Wherever possible, infilling to boundaries and obstructions should proceed as the laying of the surface course proceeds and infilling should be completed before compaction commences. Mechanical force shall not be used to obtain tight joints. For flexible paving sand shall be brushed into

the joints until they are filled to the top surface of the paving blocks. Sand for joint filling should be dry with a minimum particle size no greater than 1.18mm containing about 10% by weight passing a 0.75mm sieve. Sand color shall be agreed with EIC prior to brushing into joints. The Contractor shall allow for cutting units to achieve laying to curves (without opening up joints).

Laying Pavers

The units shall be laid to the patterns shown in the drawings. Special paver shapes designed to assist with the formation of boundaries and with changes in direction may be incorporated with the approval of the EIC.

Cutting Pavers

Paving blocks requiring cutting shall be cut using a diamond blade bench saw to give an acceptable quality edge to the satisfaction of the EIC and prior to general cutting taking place on site. Pavers shall be cut to form, neat junctions/boundaries with other paving materials/kerbs, street furniture, etc. Fillets of colour matched mortar in lieu of small pieces of unit paving shall be avoided where possible and only be used with the approval of the EIC. Paving blocks showing a jagged or irregular edge will be rejected by the EIC and must be replaced to the satisfaction of the EIC all at the Contractors expense. Care shall be taken to avoid placing more than one cut kerb and/or paver unit in close proximity to another cut unit at junctions/changes of direction of paving. The Contractor must allow for the periodic replacement of blades in cutting equipment to ensure clean cut edges to paving units.

Mixing Pavers Where there is a colour variation between batches of pavers the Contractor is to ensure that pavers are mixed to avoid patterning in paved areas and this shall be to the approval of the EIC. Where patterning occurs the Contractor shall lift, mix and relay the pavers to the EIC's approval.

Compaction of Flexible Paving Pavers on sand bed shall be subjected to passes of a steel-faced vibrating-plate compactor to adequately compact the laying course and to bed and regulate the paving blocks. The vibrating-plate compactor shall have a centrifugal force of 16-20KN, a plate area of 0.35-0.5 sq m and a frequency of 75-100Hz. enough passes shall be made to compact the paving course and produce an even surface. All trimming should be completed before the area is compacted. Compaction should follow laying as soon as possible but should not be carried out within 1m of the laying edge. Apart from this edge strip no area of paving should be left without being compacted at the completion of the days' work. The EIC's approval must be obtained if compaction is not to be completed at the end of the day's work.

Finished Levels Finished levels of the paving units shall not deviate by more than 2mm against adjacent units whilst the deviation from the design profile measured under a 3m straight edge should not exceed 10mm. The units shall form neat junctions with and prevent damage to adjacent work.

Cleaning on Completion of Work On completion the face of the units must be clear of all dust, rust and other stains, adhering mortar and other droppings. Any units from which stains cannot be removed shall be replaced at the Contractors expense and be to the approval of the EIC. Flexible paving surfaces are to be brushed down with a soft bristle brush with joints refilled with sand where required. The paved areas must be left in a neat and tidy condition to the satisfaction of the EIC.

Additional technical specifications for precast concrete paver blocks

Raw Materials - Cement

The cement used in the manufacture of high quality precast concrete paving block shall be conforming to IS 12269 (53 grade) ordinary Portland cement or IS 8112 (43 grade ordinary Portland cement). The minimum cement content in concrete used for making paver blocks should be 380 kg/cu.m.

Raw Materials - Aggregates

The fine and coarse aggregates shall consist of naturally occurring crushed or uncrushed materials which apart from the grading requirements comply with IS 383-1970. The fine aggregates used shall contain a minimum of 25 % natural silicon sand. Lime stone aggregates shall not be used. Aggregates shall contain no more than 3 % by weight of clay and shall be free from deleterious salts and contaminants.

Raw Materials - Water

The water shall be clean and free from any deleterious matter. It shall meet the requirements stipulated in IS: 456-2000.

Other materials

Any other material/ingredients used in the concrete shall conform to latest IS specifications.

Paver blocks characteristics

- The concrete pavers should have perpendicularities after release from the mould and the same should be retained until the laying.
- The surface should be of anti-skid and anti-glare type.
- The paver should have uniform chamfers to facilitate easy drainage of surface run off.
- The pavers should have uniform interlocking space of 2 mm to 3 mm to ensure compacted sand filling after vibration on the paver surface.
- The concrete mix design should be followed for each batch of materials separately and automatic batching plant is to be used to achieve uniformity in strength and quality.
- The pavers shall be manufactured in single layer only.
- Skilled labour should be employed for laying blocks to ensure line and level for laying, desired shape of the surface and adequate compaction of the sand in the joints.
- The pavers are to be skirted all round with kerbing using solid concrete or stone kerbs or as directed by the EIC. The kerbing should be embedded for minimum 100 mm depth.

Laying - Priming

It will be the responsibilities of the contractors to ensure that the manhole/pipeline cable trenches/circular drainage system etc. raised / lowered to finish paving level using the requisite materials as per instruction of Engineer. The areas of potholes/deep depressions at the isolated locations also have to be filled up before laying the paver blocks. No extra pavements will be made for this purpose.

It will be the responsibility of the contractor to ensure that undulations on the paver's blocks are eliminated after the traffic is allowed on it. Proper slope for drainage of water needs to be ensured by the Contractor. All necessary materials, tools, tackles are required to be arranged by the Contractor.

Laying - Bedding sand course

The bedding sand shall consist of clean well graded sand passing through 4.75 mm sieve and suitable for concrete. The bedding should be from either a single source or blended to achieve the following grading;

Contractor shall be responsible to ensure that single-sized, gap-graded sands or sands containing an excessive amount of fines or plastic fines are not used. The sand particles should preferably be sharp (not rounded) as sharp sand possess higher strength and resist the migration of sand from under the block to less frequency areas even though sharp sands are relatively more difficult to compact than rounded sands, the use of sharp sands is preferred for the more heavily trafficked driveways. The sand used for bedding shall be free of any deleterious soluble salts or other contaminants likely to cause efflorescence.

The sand shall be of uniform moisture content and within 4 % - 8 % when spread and shall be protected against rain when stock piled prior to spreading. Saturated sand shall not be used. The bedding sand shall be spread loose in a uniform layer as per drawing. The compacted uniform thickness shall be of 45 mm and within +/- 5 mm. Thickness variation shall not be used to correct irregularities in the base course surface.

The spread sand shall be carefully maintained in a loose dry condition and protected against pre-compaction both prior to and following screeding. Any pre-compacted sand or screeded sand left overnight shall be loosened before further laying of paving blocks take place.

Sand shall be slightly screeded in a loose condition to the predetermined depth only slightly ahead of the laying of paving unit. Any depressions in the screeded sand exceeding 5 mm shall be loosened, raked and rescreeded before laying of paving blocks.

Laying of interlocking paver blocks

Paver blocks shall be laid in pattern specified in drawing throughout the pavement. Once the laying pattern has been established, it shall continue

without interruption over the entire pavement surface. Cutting of blocks, the use of infill concrete or discontinuities in laying pattern is not to be permitted in other than approved locations.
Paver blocks shall be placed on the uncompacted screeded sand bed to the nominated laying pattern, care being taken to maintain the specified bond throughout the job. The first row shall be located next to an edge restraint. Specially manufactured edge paving blocks are permitted or edge blocks may be cut using a power saw, a mechanical or hydraulic guillotine, bolster or other approved cutting machine.

Paver blocks shall be placed to achieve gaps nominally 2 to 3 wide between adjacent paving joints. No joint shall be less than 1.5 mm not more than 4 mm. Frequent use of string lines shall be used to check alignment. In this regard the "laying face" shall be checked at least every two meters as the face proceeds. Should the face become out of alignment, it must be corrected prior to initial compaction and before further laying job is proceeded with.

In each row, all full blocked shall be laid first. Closure blocks shall be cut and fitted subsequently. Such closer blocks shall consist of not less than 25 % of full blocks.

To infill spaces between 25 mm and 50 mm wide concrete having screened sand, coarse aggregate mix and strength of 45 N/sq.mm shall be used. Within such mix the nominal aggregate size shall not exceed one third the smallest dimension of the infill space. For smaller spaces dry packed mortar shall be used.

Except where it is necessary to correct any minor variations occurring in the laying bond, the paver blocks shall not be hammered into position. Where adjustment of paver blocks, necessary care shall be taken to avoid the premature compaction of the sand bedding.

Initial Compaction: After laying the paver blocks, they shall be compacted to achieve consolidation of the sand bedding and brought to design levels and profiles by not less than two (2) passes of a suitable plate compactor. The compactor shall be a high-frequency, low amplitude mechanical flat plate vibrator having plate area sufficient to cover a minimum of twelve paving blocks. Prior to compaction all debris shall be removed from the surface.

Compaction shall proceed as closely as possible following laying and prior to any traffic. Compaction shall not, however, be attempted within one meter of the laying face. Compaction shall continue until lipping has been

eliminated between adjoining blocks. Joints shall then be filled and re-compacted as described in relevant Clause.
All work further than one meter from the laying face shall be left fully compacted at the completion of each day's laying.
Any blocks that are structurally damaged prior to or during compaction shall be immediately removed and replaced. Sufficient plate compactors shall be maintained at the paving site for both bedding compaction and joint filling.

Joint filling and final compaction:

As soon as possible after compaction and in any case prior to the termination of work on that day and prior to the acceptance of vehicular traffic, sand for joint filling shall be spread over the pavement.
Joint sand shall pass a 2.36 mm (No. 8) sieve and shall be free of soluble salts or contaminants likely to cause efflorescence. The same shall with the be well graded.

The Contractor shall supply a sample of the jointing sand to be used in the contract prior to delivery and such materials to site for incorporation into the works. Certificates of test results issued by a recognized testing laboratory confirming that the samples conform to the requirements of this specifications shall accompany the sample.

The jointing sand shall be boomed to fill the joints. Excess sand shall then be removed from the pavement surface and the jointing sand shall be compacted with not less than one (1) Pass by the plate vibrator and joints refilled with sand to full depth. This procedure shall be repeated until all joints are completely filled with sand. No traffic shall be permitted to use the pavement until all joints have been completely filled with sand and compacted.

Both the sand and paver blocks shall be dry when sand is spread and boomed into the joints to prevent premature setting of the sand.
The difference in level (lipping) between adjacent blocks shall not exceed 3 mm with not more than 1 % in any 3 m x 3 mm area exceeding 2 mm. Pavement which is deformed beyond above limits after final compaction shall be taken out and reconstructed to the satisfaction of the Engineer.

Edge Restraint

Edge restrains need to be sufficiently robust to withstand override by the anticipated traffic to withstand thermal expansion and to prevent loss of the laying course material from beneath the surface course. The edge restraint should present a vertical face down the level of the underside on the laying course.

The surface course should not be vibrated until the edge restraint together with any bedding or concrete hunching has gained sufficient strength. It is essential that edge restraints are adequately secured.

Concrete Pavor Block Making Machine

The block making machine should ensure the following:
High degree of dimensional accuracy (± 3 mm)
Precast blocks with spacer nibs (23 mm to ensure uniform joints)
High compaction energy (to produce blocks with high compressive strength)
The above can be generally achieve by machine with following feature –
Block making machine should have simultaneously application of high intense vibration to moulds at 3000 V.P.M. and hydraulic pressure 800 psi

Concrete Batching & Mixing Plant

The concrete Mix design should be followed for each batch of materials. The concrete ingredient should be mixed in concrete Batching & Mixing plant with suitable capacity. The plant should be equipped with automatic control panel for maintaining water cement ratio from batch to batch to obtain concrete of uniform quality and strength. The plant should be equipped with adequate mechanism for mechanized loading on raw materials into mixer and conveyor belt for transportation of concrete from mixer to concrete block making machine.

Sampling and testing procedures for paver blocks

Sample size
Average of minimum 3 samples per 5000 blocks shall be provided for testing.
Sampling for testing:
Sampling for testing of paver blocks shall be done in accordance with relevant Clause.

Compressive Strength:

Testing for compressive strength shall be undertaken. The average compressive strength of the 80 mm. thick paver blocks tested shall be 50 N/Sq.mm and average compressive strength of the 60 mm. thick paver blocks tested shall be 45 N/Sq.mm.

Water Absorption:

Testing for water absorption shall be in accordance with IS: 2185: 1979: Part-(Specifications for Concrete Masonry Blocks) Appendix C.

Sampling of Paver Blocks

Method of sampling:

Before laying paver blocks, each designated section comprising not more than 50,000 blocks shall be divided into ten approximately equal groups. Nine blocks shall be drawn from each group.

Marking and Identification:

All samples shall be clearly marked at the time of sampling in such a way that the designated section of part thereof and the consignment represented by the sample are clearly defined.

The sample shall be dispatched to the approved test laboratory taking precaution to avoid damage to the paving in transit. Protect the paving from damage and contamination until they have been tested. The samples shall be stored in water at 20 ºC + 5 ºC for 24 hours prior to testing.

Procedure for testing of compressive strength for paver blocks

Testing machine:

The testing machines shall be of suitable capacity for the test and capable of applying the load at the rate specified. It shall comply as regards repeatability and accuracy with the requirements of relevant IS Specification.

Procedure:

The sample specimens shall be tested in wet condition after being stored for at least 24 hours in water maintained at a temperature of 20 ºC + 5 ºC before the specimens are submerged in water, the necessary area shall be determined.

The plates of the testing machine shall be wiped clean and any loose girt or other material removed from the contact faces of the specimen. Plywood normally 4 mm. thick shall be used as packing between the upper and lower faces of the specimen and the machine plates and these boards shall be larger than the specimen by a margin of at least 5 mm at all points. Fresh packing shall be used for each specimen tested. The specimen shall be placed in the machine with the wearing surface in a horizontal plane and in such a way that the axes of the specimen are aligned with those of the machine plates. The load shall be applied without shock and increased continuously at the rate of Approximately 15 N/sq.mm per minute until no greater load can be sustained. The maximum load applied to the specimen shall be recorded.

Calculation of corrected strength:

The compressive strength of each block specimen shall be calculated by dividing the maximum load by full cross section area and multiplying by appropriate factors.
Thickness and chamfer correction factors for compressive strength
Work size thickness (mm)Correction Factors
Plain blockChamfered block
601.001.06
801.121.18
1001.181.24

Compressive strength calculation

The average corrected compressive strength for the designed block section shall be calculated.

Method for the determination of water absorption

The test specimens shall be completely immersed in water at room temperature for 24 hours.
The specimens shall then be weighed, while suspended by a metal wire and completely submerged in water.
They shall be removed from the water and allowed to drain for one minute. Visible surface water should be removed with a damp cloth and immediately weighed.
Subsequent to saturation, all specimens shall be dried in a ventilated oven at 100 to 115 ºC for not less than 24 hours and until two successive weightings at intervals of 2 hours show an increment of loss not greater than 0.2 percent of the last previously determined mass of the specimen.
Calculate the absorption as follows -
Absorption, kg/cum = A – B x 1000
A – C
Absorption, percent = A – B x 100
B Where;
A = Wet mass of unit in Kg.
B = Dry mass of unit in Kg and
C = Suspended immersed mass of unit in Kg
Measurement
Precast concrete paving shall be measured in square meters of finished paved area, accurate to the nearest centimeter in each direction.
Rate

The rate shall include the cost of all materials and labour involved in all the operations described above.