

Important tips

STANDARD DATAS Of Civil Engg.

Slump IS 456

Lightly reinforced 25 – 75 mm

Heavily reinforced 75 – 100 mm

Trench fill (insitu & Tremie) 100 – 150 mm

(For Tremie vibrator not required)

Accuracy of measuring equipment in batching plant.

Cement : $\pm 2\%$

Aggregate : $\pm 3\%$

Admixture : $\pm 3\%$

Water : $\pm 3\%$

Mixing time : 2 minutes for one mixing.(site Mixing)

Reinforcement:-

For effective depth $D < 200\text{mm} = \underline{\pm}10\text{mm}$

For effective depth $D > 200\text{mm} = \underline{\pm}15\text{mm}$

For Cover to reinforcement = $\underline{\pm}10\text{mm}$

Maximum freefall of concrete = 1.50 m height.

Reinforcement:-

- Lapping is not allowed for the bars having diameters more than 36 mm.
- Chair spacing maximum spacing is 1.00 m (or) 1 No per 1 Sq.m
- For dowels rod minimum of 12 mm dia should be used.
- Chairs minimum of 12 mm dia bars to be used.
- Longitudinal reinforcement not less than 0.8% and more than 6% of gross C/S.
- Minimum bars for square column is 4 No's and 6 No's for circular column.
- Main bars in the slabs shall not be less than 8 mm (HYSD) or 10 mm (Plain bars) and the distributors not less than 8 mm and not more than 1/8 of slab thickness.
- Minimum thickness of slab is 125 mm
- Dimension tolerance for cubes + 2 mm.
- Free fall of concrete is allowed maximum to 1.50m.
- Lap slices not be used for bar larger than 36 mm.
- Water absorption not more than 15 %.
- PH value of the water should not be less than 6.
- Compressive strength of Bricks is 3.5 N / mm²
- In steel reinforcement binding wire required is 8 kg per MT
- In soil filling as per IS code 100 sqm should take 3 sample for core cutting test

DENSITY OF MATERIALS:-

Weight of Bricks = 1600-1920 Kg/M³

Weight of Block work = 1920 Kg/M³

Weight of R.C.C = 2310 – 2700 Kg/M³

CURING:-

Super Sulphate cement : 7 days

Ordinary Portland cement OPC : 10 days

Minerals & Admixture added cement : 14 days

STRIPPING TIME (De-Shuttering):-

For columns, walls, vertical form works : 16-24 hrs

Soffit formwork to slabs : 3 days (props to be refixed after removal)

Soffit to beams props : 7 days props to refix after removal.

Spanning up to 4.50m : 7 days

Spanning over 4.50m : 14 days

Arches spanning up to 6m : 14 days

Arches spanning over 6m : 21 days

CUBE SAMPLES:-

1 – 5 M3 : 1 No.

6 – 15 M3 : 2 No's

16 – 30 M3 : 3 No's

31 – 50 M3 : 4 No's

Above 50 M3 : 4 + 1 No of addition sample for each 50 M3

COMPRESSIVE STRENGTH:-

3 days : 45 %

7 days : 67 – 70 %

14 days : 85 %

28 days : 100% +

QUANTITIES REQUIRED:-

Plastering (CM 1:3)	= 1.50 bags / 10 m ²
Plastering (CM 1:5)	= 1.05 bags / 10 m ²
Ceiling Plastering (CM 1:3)	= 48 kg / 10 m ²
Brick work (CM 1:5)	= 86 Kg / 10 m ³
Brick work (CM 1:6) 9" thick	= 80.64 Kg / 10 m ³
Brick work (CM 1:3) 4½" thick	= 15.46 Kg / 10 m ³
Lime for white washing	= 10 Kg/100 m ²
Painting	= 10 ltr/ 100 m ²
Distemper 1st coat	= 6.5 Kg / 100 m ²
Distemper 2nd coat	= 5.0 kg / 100 m ²

WATER CEMENT RATIO:-

M20 = 0.55

M25 = 0.50

M30 = 0.45

M35 = 0.45

M40 = 0.40

COVER TO MAIN REINFORCEMENT:-

Column : 40 mm ($D > 12\text{mm}$)

Column : 25 mm ($D = 12\text{mm}$)

Beam : 25 mm

Slab : 15 mm (or) not less than dia of the bar.

Footing : 50 mm

Sunshade (Chajja) : 25 mm

Calculation of Materials:-

a) For 1 m³ of concrete Mix 1:2:4 (M15)

Add 50% for wet concrete = 1.50 m³

= $1.50 / (1+2+4) = 0.214 \text{ m}^3$

For 1 m³ = 30 bags of cement required (1440/50) say 30 bags

Cement = $0.214 \times 30 = \mathbf{6.42 \text{ bags}}$

Sand = $0.214 \times 2 = \mathbf{0.428 \text{ m}^3}$

Aggregate = $0.214 \times 4 = \mathbf{0.856 \text{ m}^3}$

Calculation of Materials:-

b) Wall plastering in CM 1:4 of 12 mm thick for 100 m²:-

$$\text{Volume} = 100 \times (12/1000) = 1.20 \text{ m}^3$$

$$\text{Add 30 to 35\% as bulking of sand} = 0.36 \text{ m}^3$$

$$\text{Add 20 as wastage of sand} = 0.312 \text{ m}^3$$

$$\text{Total} = \mathbf{1.872 \text{ m}^3}$$

$$= (1.872/1+4) = 0.374 \text{ m}^3$$

$$\text{Cement} = 0.374 \times 30 = \mathbf{10.77 \text{ bags}}$$

$$\text{Sand} = 0.374 \times 4 = \mathbf{1.496 \text{ m}^3}$$

Calculation of Materials:-

c) For 100 m³ of solid Block masonry in CM 1:6 mix 8" thick:-

Volume = 100 x 0.2 (Thickness of wall)

= 20 m³

No. of blocks required = 20/(0.4 x 0.2 x 0.2)

= 12502 No's

Volume of mortar = 20 - {0.39 x 0.19 x 0.19 x 1250}

= 20 - 17.598

= 2.40 m³

Note: 200mm - 10 mm for mortar thickness = 190 mm

Blocks = 17.598/(0.4 x 0.2 x 0.2)

= 1100 No's

Add 2% wastage = 22

Total = 1122 No's

Increase by 25% for dry mortar = 3 M³

- 10 -

= 3/ (1+6)

= 0.429 M³

Cement = 0.429 x 30 = 12.50 bags

Sand = 0.429 x 6 = 2.57 M³

Blocks = 1122 No's

WEIGHT OF ROD PER METER LENGTH:-

DIA WEIGHT PER METER

6mm = 0.222

8mm = 0.395

10mm = 0.616

12mm = 0.888

16mm = 1.578

20mm = 2.466

25mm = 3.853

32mm = 6.313

40mm = 9.865

CMENT REQUIREMENTS:-

M10 : 210 Kg

M20 : 320 Kg

M25 : 340 Kg

M30 : 380 Kg

M35 : 410 Kg

M40 : 430 Kg

M45 : 450 Kg

M50 : 450 + M.S 7.5%

CONCRETE COVER

CLEAR COVER TO MAIN REINFORCEMENT IN

1. FOOTINGS : 50 mm
2. RAFT FOUNDATION.TOP : 50 mm
3. RAFT FOUNDATION.BOTTOM/SIDES : 75 mm
4. STRAP BEAM : 50 mm
5. GRADE SLAB : 20 mm
6. COLUMN : 40 mm
7. SHEAR WALL : 25 mm
8. BEAMS : 25 mm
9. SLABS : 15 mm
10. FLAT SLAB : 20 mm
11. STAIRCASE : 15 mm
12. RET. WALL : 20/ 25 mm