

TABLE-6.6 : MAXIMUM WATER CONTENT PER CUBIC METRE OF CONCRETE FOR NOMINAL MAXIMUM SIZE OF AGGREGATE [For slump 25 to 50 mm]

Sr. No.	Nominal Maximum Size of Aggregate (mm)	Maximum Water Content (kg)
1	10	208
2	20	186
3	40	165

Table 3.1 : Minimum Cement content, Maximum water-cement ratio and Minimum grade of concrete [IS : 3370 (Part-1) – 2009 (table-1)]

Sl. No. (1)	Concrete (2)	Minimum cement content (3)	Maximum free w/c ratio (4)	Minimum grade of concrete (5)
(i)	Plain concrete	250	0.50	M20
(ii)	Reinforced concrete	320	0.45	M30
(iii)	Prestressed concrete	360	0.40	M40

For small capacity tanks upto 50 m³ ...

**TABLE 6.3
PROPORTIONS OF INGREDIENTS IN NOMINAL MIXES**

Grade of concrete	Proportion		
	C	F.A.	C.A.
M 5	1	5	10
M 7.5	1	4	8
M 10	1	3	6
M 15	1	2	4
M 20	1	1.5	3

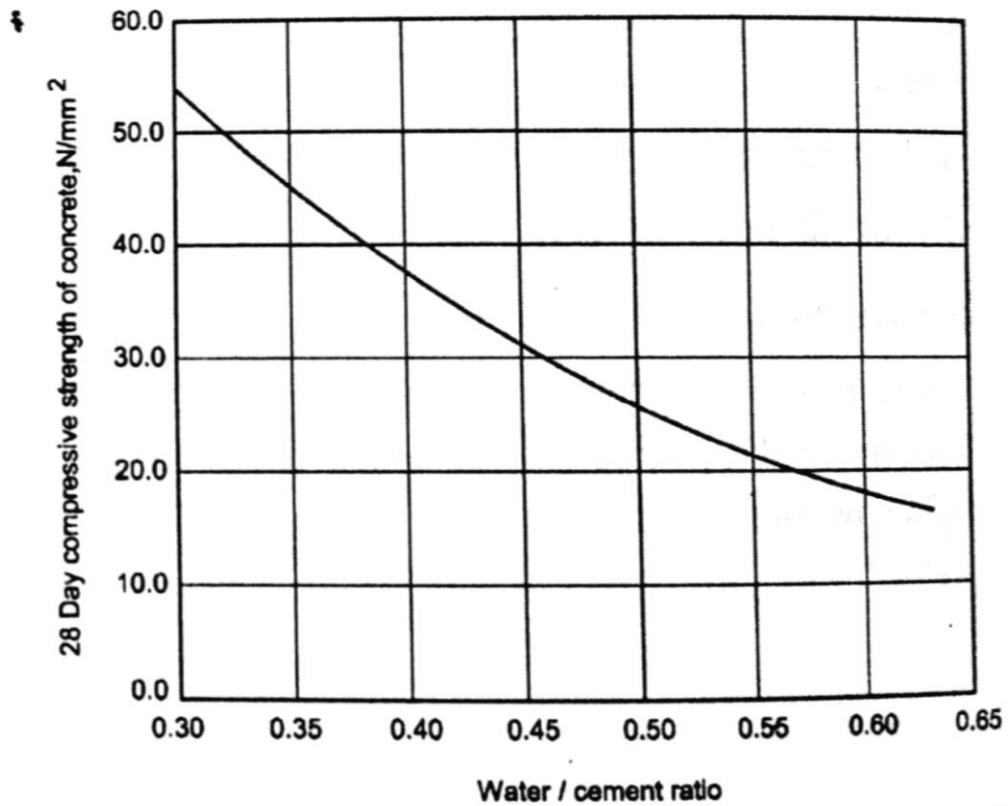


FIG. 6.1 : GENERALIZED RELATION BETWEEN FREE WATER-CEMENT RATIO AND COMPRESSIVE STRENGTH OF CONCRETE

Table 3.2 : Permissible Stresses in Concrete - Strength Design
[IS : 3370 (Part-2) – 2009, Table-2]

Sl. No.	Grade of Concrete	Permissible Stresses in Compression		Permissible Stress in bond (average) for plain bars in tension τ_{bd} N/mm ²
		Bending σ_{cbc} N/mm ²	Direct σ_{cc} N/mm ²	
(i)	M25	8.5	6.0	0.9
(ii)	M30	10.0	8.0	1.0
(iii)	M35	11.5	9.0	1.1
(iv)	M40	13.0	10.0	1.2
(v)	M45	14.5	11.0	1.3
(vi)	M50	16.0	12.0	1.4

per IS : 456-20

TABLE 6.1
GRADES OF CONCRETE

Group	Grade designation	Specified characteristic compressive strength of 150 mm cube at 28 days, N/mm ²
Ordinary Concrete	M 10	10
	M 15	15
	M 20	20
Standard Concrete	M 25	25
	M 30	30
	M 35	35
	M 40	40
	M 45	45
	M 50	50
	M 55	55
High Strength Concrete	M 60	60
	M 65	65
	M 70	70
	M 75	75
	M 80	80

TABLE 6.2
PROPORTIONS FOR NOMINAL MIX CONCRETE
(Ref. : IS : 456-2000, table-9, P. 23)

Grade of Concrete	Total Quantity of Dry Aggregates by mass Per 50 kg of Cement (F.A. + C.A.) Maxi. (Kg)	Proportion of F.A. to C.A. (by mass)	Quantity of water Per 50 kg of Cement (Maxi.)
M 5	800	Generally 1 : 2	60
M 7.5	625	but Subject to	45
M 10	480	Upper limit 1 : 1 $\frac{1}{2}$	34
M 15	330	Lower limit 1 : 2 $\frac{1}{2}$	32
M 20	250		30

મટિરિયલ એસ્ટીમેટ

એક ઘનફૂટ કોંક્રીટ માટેની ગણતરી



કોંક્રીટ: (૧:૧.૫:૩)

(સિમેન્ટ : રેતી : કપચી-ગ્રીટ)

[૧ ઘનફૂટ કોંક્રીટ/મોર્ટાર બનાવવાં માટે આશરે ૧.૫૨ ગણી માલ-સામગ્રી ની જરૂર પડે છે.]

$$= (૧ \times ૧.૫૨ / \text{પ્રમાણનું ટોટલ માપ}) = (૧.૫૨ / (૧+૧.૫+૩))$$

$$= (૧.૫૨ / ૫.૫) = ૦.૨૭૬ ઘનફૂટ$$

$$\text{સિમેન્ટની ૧ બેગ નું વોલ્યુમ} = ૧.૨૫ \text{ ઘનફૂટ}$$

$$\text{સિમેન્ટ બેગ} = (૦.૨૭૬ / ૧.૨૫)$$

$$= ૦.૨૨ \text{ બેગ / ઘનફૂટ}$$

$$\text{રેતી} = (૦.૨૭૬ \times ૧.૫) = ૦.૪૧૪ \text{ ઘનફૂટ}$$

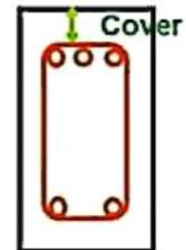
$$\text{કપચી-ગ્રીટ} = (૦.૨૭૬ \times ૩) = ૦.૮૨૮ \text{ ઘનફૂટ}$$

Grade	Proportion	Cement	Sand	aggrigate
M25	1:1:2	547.20KG	0.38 M ³	0.76 M ³
M20	1:1.5:3	397KG	0.41M ³	0.82 M ³
M15	1:2:4	312KG	0.43 M ³	0.86 M ³
M10	1:3:6	218KG	0.45 M ³	0.91 M ³
M7.5	1:4:8	168KG	0.46 M ³	0.93 M ³
M5	1:5:10	136KG	0.47 M ³	0.95 M ³

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 on earth	: 20/ 25 mm
13. WATER RETAINING STRUCTURES	: 20 / 30 mm



According to Indian Standards