

Table (1): Recommended slumps for various types of construction.

Types of construction	Slump (mm)	
	maximum	minimum
Reinforced foundation and footings	75	25
Plain footings, caissons, and substructure walls	75	25
Beams and reinforced walls	100	25
Building columns	100	25
Pavements and slabs	75	25
Mass concrete	75	25

Table (2): Approximate mixing water and air content requirements for different slumps and nominal maximum size of aggregates.

Slump (mm)	Water, kg/m ³ of concrete for indicated nominal maximum size of aggregate							
	9.5	12.5	19	25	37.5	50	75	150
Non-air-entrained concrete								
25 to 50	207	199	190	179	166	154	130	113
75 to 100	228	216	205	193	181	169	145	124
150 to 175	243	228	216	202	190	178	160	---
Approximate amount of entrapped air %	3	2.5	2	1.5	1	0.5	0.3	0.2
Air-entrained concrete								
25 to 50	181	175	168	160	150	142	122	107
75 to 100	202	193	184	175	165	157	133	119
150 to 175	216	205	197	184	174	166	154	---
Recommended average total air content, % for level of exposure :								
Mild exposure	4.5	4.0	3.5	3.0	2.5	2.0	1.5	1.0
Moderate exposure	6.0	5.5	5.0	4.5	4.5	4.0	3.5	3.0
Extreme exposure	7.5	7.0	6.0	6.0	5.5	5.5	4.5	4.0

Table (3): Relationship between water-cement ratio and compressive strength of concrete.

Compressive strength, at 28 days, MPa	Water-cement ratio, by mass	
	Non-air-entrained concrete	Air-entrained concrete
40	0.42	----
35	0.47	0.39
30	0.54	0.45
25	0.61	0.52
20	0.69	0.60
15	0.79	0.70

Table (4): Maximum permissible water-cement ratios for concrete in sever conditions.

Type of structure	Structure wet continuously or frequently and exposure to freezing and thawing	Structure exposure to sea water or sulfate
Thin sections (railings, curbs, sills, ledges, ornamental work) and sections with less than 5mm cover over steel	0.45	0.40
All other structure	0.50	0.45

Table (5): Volume of coarse aggregate per unit of volume of concrete.

nominal maximum size of aggregate, (mm)	Volume of dry-rodded coarse aggregate per unit volume of concrete for different fineness modulus of fine aggregate			
	2.40	2.60	2.80	3.00
9.5	0.50	0.48	0.46	0.44
12.5	0.59	0.57	0.55	0.53
19	0.66	0.64	0.62	0.60
25	0.71	0.69	0.67	0.65
37.5	0.75	0.73	0.71	0.69
50	0.78	0.76	0.74	0.72
75	0.82	0.80	0.78	0.76
150	0.87	0.85	0.83	0.81

Table (6): First estimate of mass of fresh concrete.

nominal maximum size of aggregate, (mm)	First estimate of concrete unit mass, kg/m ³	
	Non-air-entrained concrete	Air-entrained concrete
9.5	2280	2200
12.5	2310	2230
19	2345	2275
25	2380	2290
37.5	2410	2350
50	2445	2345
75	2490	2405
150	2530	2435