

CONCRETE MIX DESIGN

**Table – 5**  
**Minimum Cement Content, Maximum Water-Cement Ratio and Minimum Grade of Concrete for Different Exposures with Normal Weight Aggregate of 20 mm Nominal Maximum Size**  
**IS: 456-2000**

Sl No.	Exposure	Plain Concrete			Reinforced Concrete		
		Minimum Cement Content kg/m <sup>2</sup>	Maximum Free Water-Cement Ratio	Minimum Grade of Concrete	Minimum Cement Content kg/m <sup>2</sup>	Maximum Free Water-Cement Ratio	Minimum Grade of Concrete
1	(2)	(3)	(4)	(5)	(6)	(7)	(8)
i)	Mild	220	0.60	-	300	0.55	M20
ii)	Moderate	240	0.60	M15	300	0.50	M25
iii)	Severe	250	0.50	M20	320	0.45	M30
iv)	Very Severe	260	0.45	M20	340	0.45	M35
v)	Extreme	280	0.40	M25	360	0.40	M40

Notes:

- 1 Cement content prescribed in this table is irrespective of the grades of cement and it is inclusive of additions mentioned in 5.2 additions such as fly ash or ground granulated blast furnace slag may be taken into account in the concrete composition with respect to the cement content and water-cement ratio if the suitability is established and as long as the maximum amounts taken into account do not exceed the limit of Pozzolana and slag specified in IS: 1489 (Part-1) and IS: 455 respectively.
- 2 Minimum grade for plain concrete under mild exposure condition is not specified.