

GRADE C50 SP CONCRETE (56days)
Table 4 Completed concrete mix designform for unrestricted design.


Serial No	C50 SP- (OPC/TC/Hyp +M/200)		Reference or calculation	Values																		
1	1.1	Characteristic strength	Specified	$\frac{50}{\text{N/mm}^2}$ at $\frac{56}{\text{days}}$ Proportion defective $\frac{5}{\%}$																		
	1.2	Standard deviation	Fig.3	$\frac{6}{\text{N/mm}^2}$ or no data $\frac{\text{N/mm}^2}{\text{N/mm}^2}$																		
	1.3	Margin	C1 or Specified	$(k = \frac{1.64}{\text{N/mm}^2}) \times \frac{1.64}{\text{N/mm}^2} \times \frac{6}{\text{N/mm}^2} = \frac{10}{\text{N/mm}^2}$ $\frac{\text{N/mm}^2}{\text{N/mm}^2}$																		
	1.4	Target mean strength	C2	$\frac{50}{\text{N/mm}^2} + \frac{10}{\text{N/mm}^2} = \frac{60}{\text{N/mm}^2}$																		
	1.5	Cement Type	Specified	OPC/SRPC/RHPC																		
	1.6	Aggregate type: Coarse		Crushed/Un-crushed																		
	1.6	Aggregate type: Fine		Crushed/Un-crushed																		
	1.7	Free-water/cement ratio	Table2, Fig 4	$\frac{0.34}{\text{Use the lower value}}$																		
2	1.8	Maximum free water/cement ratio	Specified	$\frac{0.34}{\text{Use the lower value}}$																		
	2.1	Slump or Vebe time	Specified	Slump $\frac{200}{\text{mm}}$ or Vebe time $\frac{\text{mm}}{\text{s}}$																		
	2.2	Maximum aggregate size	Specified	$\frac{20}{\text{mm}}$																		
	2.3	Free - water content	Table3	$\frac{165}{\text{kg/m}^3}$																		
3	3.1	(Cement + Fly Ash) content	C3	$\frac{165}{\text{kg/m}^3} \div \frac{0.34}{\text{kg/m}^3} = \frac{485}{\text{kg/m}^3}$																		
	3.2	Maximum cement content	Specified	$\frac{\text{kg/m}^3}{\text{kg/m}^3}$																		
	3.3	Minimum cement content	Specified	$\frac{\text{kg/m}^3}{\text{kg/m}^3}$																		
	3.3	Minimum cement content		Fly Ash $\frac{194}{\text{kg/m}^3}$ Cement $\frac{291}{\text{kg/m}^3}$																		
	3.4	Modified free - water/cement ratio		$\frac{\text{kg/m}^3}{\text{kg/m}^3}$																		
4	4.1	Relative density of aggregate(SSD)		$\frac{2.8}{\text{known/assumed}}$																		
	4.2	Concrete Density	Fig 5	$\frac{2470}{\text{kg/m}^3}$																		
	4.3	Total aggregate content	C4	$\frac{2470}{\text{kg/m}^3} - \frac{165}{\text{kg/m}^3} - \frac{485}{\text{kg/m}^3} = \frac{1820}{\text{kg/m}^3}$																		
5	5.1	Grading of fine aggregate	Percentage passing 600µm sieve	$\frac{\%}{\%}$																		
	5.2	Proportion of fine aggregate	Fig 6	$\frac{45}{\%}$																		
	5.3	Fine aggregate content		$\frac{1820}{\text{kg/m}^3} \times \frac{0.45}{\text{kg/m}^3} = \frac{819}{\text{kg/m}^3}$																		
	5.4	Coarse aggregate content	C5	$\frac{1820}{\text{kg/m}^3} - \frac{819}{\text{kg/m}^3} = \frac{1001}{\text{kg/m}^3}$																		
<table border="1"> <thead> <tr> <th>Quantities</th> <th>Cement (kg)</th> <th>Fly Ash</th> <th>Water (kg or L)</th> <th>Fine aggregate (kg)</th> <th>Coarse aggregate(kg)</th> </tr> </thead> <tbody> <tr> <td>per m³ (to nearest 5kg)</td> <td>290</td> <td>195</td> <td>165</td> <td>820</td> <td>1000</td> </tr> <tr> <td>per trial mix of m³</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>					Quantities	Cement (kg)	Fly Ash	Water (kg or L)	Fine aggregate (kg)	Coarse aggregate(kg)	per m ³ (to nearest 5kg)	290	195	165	820	1000	per trial mix of m ³					
Quantities	Cement (kg)	Fly Ash	Water (kg or L)	Fine aggregate (kg)	Coarse aggregate(kg)																	
per m ³ (to nearest 5kg)	290	195	165	820	1000																	
per trial mix of m ³																						

Items in italics are optional limiting values that may be specified (see Section 7)

 1N/mm² = 1MN/m² = Mpa (see footnote to Section 3)

PPC=Portland Pozzolana Cement; OPC = ordinary Portland cement; SRPC = sulphate resisting Portland cement

RHPC=rapid-hardening Portland cementRelative density = specific gravity (see footnote to para 5.4)

SSD = based on a saturated surface- dry basic.

***add 4.9 Liters of Super Plasticiser -Hypercrete +M**

