GRADE C50 SP CONCRETE

Table 4 Completed concrete mix designform for unrestricted design.

Serial No		C50 SP- (OPC/TC/Hyp +M/200)

Stage	Item		Reference or calculation	Values				
1	1.1	Characteristic strength	Specified	**50** N/mm² at **28** days				
				Proportion defective **5** %				
	1.2	Standard deviation	Fig.3	**6** N/mm² or no data				N/mm²
	1.3	Margin	C1	(k= **1.64**) **1.64** x **6** = **10**				N/mm²
			or					
			Specified				/	N/mm²
	1.4	Target mean strength	C2	**50** + **10** = **60**				N/mm²
	1.5	Cement Type	Specified	OPC/SR~~PC/RHPC~~				
	1.6	Aggregate type: Coarse		Crushed/Un~~crushed~~				
		Aggregate type: Fine		Crushed/Un~~crushed~~		**Fly Ash**	**30%**	
	1.7	Free-water/cement ratio	Table2,Fig 4	**0.33**				
	1.8	*Maximem free water/cement ratio*	Specified			Use the lower value	**0.33**	
2								
	2.1	Slump or Vebe time	Specified	Slump 200 mm or Vebe time			/	s
	2.2	Maximum aggregate size	Specified				**20**	mm
	2.3	Free - water content	Table3				**160**	kg/m³
3	3.1	**(Cement + Fly Ash) content**	C3	**160** ÷ **0.33** = **485**				kg/m³
	3.2	*Maximum cement content*	*Specified*	/ kg/m³				
	3.3	*Minimum cement content*	*Specified*	kg/m³		**Fly Ash**	**145**	kg/m3
				use 3.1 if ≤ 3.2 use 3.3 if > 3.1		**Cement**	**340**	kg/m3
	3.4	Modified free - water/cement ratio					/	
4	4.1	Relative density of aggregate(SSD)		**2.8** known/assumed				
	4.2	Concrete Density	Fig 5				**2470**	kg/m³
	4.3	Total aggregate content	C4	**2470** - **160** - **486** = **1824**				kg/m³
5	5.1	Grading of fine aggregate	Percentage passing 600µm sieve					%
	5.2	Propotion of fine aggregate	Fig 6	**43**				%
	5.3	Fine aggregate content		**1824** x **0.43** = **784**				kg/m³
	5.4	Coarse aggregate content	C5	**1824** - **784** = **1040**				kg/m³

Quantities	Cement (kg)	Fly Ash	Water (kg or L)	Fine aggregate (kg)	Coarse aggregate(kg) ~~10mm~~ 20mm ~~10mm~~
per m³ (to nearest 5kg)	**340**	**145**	**160**	**785**	**1040**
per trial mix of m³					

Items in inalics 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 Plasiticiser -Hypercrete +M**