GRADE C40 SP CONCRETE

Table 4 Completed concrete mix designform for unrestricted design.

Serial No		C40 SP- (OPC/FA/TC/Hyp +M/200)

Stage	Item		Reference or calculation	Values					
1	1.1	Characteristic strength	Specified	**40**	N/mm² at	**56**	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		**40** + **10**	= **50**	N/mm²		
	1.5	Cement Type	Specified	OPC/SR~~PC/RHPC~~	Ultra Tech				
	1.6	Aggregate type: Coarse		Crushed/Un~~crushed~~	**Fly Ash**	**40%**			
		Aggregate type: Fine		Crushed/Un~~crushed~~					
	1.7	Free-water/cement ratio	Table2,Fig 4	**0.35**					
	1.8	*Maximem free water/cement ratio*	Specified		Use the lower value	**0.35**			
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			**158**	kg/m³		
3	3.1	**(Cement + Fly Ash) content**	C3	**158** ÷ **0.35**	=	**451**	kg/m³		
	3.2	*Maximum cement content*	*Specified*	/	kg/m³				
	3.3	*Minimum cement content*	*Specified*		kg/m³	**Fly Ash**	**181**	kg/m3	
				use 3.1 if ≤ 3.2 use 3.3 if > 3.1		**Cement**	**271**	kg/m3	
	3.4	Modified free - water/cement ratio					/		
4	4.1	Relative density of aggregate(SSD)		**2.7**	known/assumed				
	4.2	Concrete Density	Fig 5			**2460**	kg/m³		
	4.3	Total aggregate content	C4	**2460** - **158** - **451**	=	**1851**	kg/m³		
5	5.1	Grading of fine aggregate	Percentage passing 600µm sieve				%		
	5.2	Propotion of fine aggregate	Fig 6	**45**			%		
	5.3	Fine aggregate content		**1851** x **0.45**	=	**833**	kg/m³		
	5.4	Coarse aggregate content	C5	**1851** - **833**	=	**1018**	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)	**270**	**180**	**160**	**830**	**1020**
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 4.05 Liters of Super Plasiticiser -Hypercrete +M**