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	**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		**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**	**30%**				
		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			**160**	kg/m³			
3	3.1	**(Cement + Fly Ash) content**	C3	**160**	÷ **0.35**	= **457**	kg/m³			
	3.2	*Maximum cement content*	*Specified*	/	kg/m³					
	3.3	*Minimum cement content*	*Specified*		kg/m³	**Fly Ash**	**137**	kg/m3		
				use 3.1 if ≤ 3.2 use 3.3 if > 3.1		**Cement**	**320**	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			**2470**	kg/m³			
	4.3	Total aggregate content	C4	**2470**	- **160**	- **457**	= **1853**	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		**1853**	x **0.43**	= **797**	kg/m³			
	5.4	Coarse aggregate content	C5	**1853**	- **797**	= **1056**	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)	**320**	**135**	**160**	**800**	**1055**
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 4.5 Liters of Super Plasiticiser -Hypercrete +M**

2470