Experimental Study on Portland Pozzolana Cement and Citric Acid Influence on Compressive Strength of Reinforced Concrete

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Table A.1- Concrete Mix Design (DOE)

1	**1.1** characteristic strength **1.2** standard deviation **1.3** margin **1.4** Target mean strength **1.5** Cement type **1.6** Aggregate type: coarse Aggregate type: fine **1.7** free water/cement ratio **1.8** maximum free water/cement ratio	Specified Fig 3 C1 C2 Specified Table 2 Fig 4 Specified	**30** N/mm2 at **28** days Proportion defective **5** percent / N/mm2 or no data **8** N/mm2 (k=**1.64**) **1.64** * **8** = **13.12** N/mm2 30 + 13.12 = 43.12 N/mm2 **OPC** / SRPC/RHPC **Crushed** **Uncrushed & crushed** **0.5** ---- use the lower value of **0.5**
2	**2.1** slump or vibe time **2.2** maximum aggregate size **2.3** free water content	Specified Specified Table 3	Slump **30-60** mm or vibe time -- s **19** mm **190** kg/m3
3	**1.1** cement content **1.2** maximum cement content **1.3** minimum cement content **3.4** modified free water/cement ratio	C3 Specified Specified	**190** ÷ **0.5** = **380** kg/m3 ---------- kg/m3 ---------- kg/m3 Use 3.1 if ≤ 3.2 Use 3.3 if ≤ 3.1 ----------
4	**4.1** relative density of aggregate (SSD) **4.2** concrete density **4.3** total aggregate content	Fig 5 C4	**2.8** known/assumed **2400** kg/m3 **2400** - **380** - **209** = **1811** kg/m3

5	**5.1** grading of fine aggregate **5.2** proportion of fine aggregate **5.3** fine aggregate content **5.4** Coarse aggregate content		Percentage passing 600 µm sieve Fig 6 C5	**60** % **30** % **1811** * **0.3** = **543.3** kg/m3 **1811** - **543.3** = **1267.7** kg/m3	
Quantity	Cement (kg)	water (kg/lt)	River sand (kg)	Coarse aggregate (kg)	
				10 mm	**20mm**
Per m3 (to the nearest 5 kg)	**380**	**209**	**543.3**	**418.34**	**849.36**
Per trial mix of **0.1** m3	**38**	**20.9**	**54.33**	**41.834**	**84.936**