

Table 1. Chemical and physical properties of Ordinary Portland Cement

Chemical analysis	(%)	Physical properties	Unit	
SiO ₂	21.5	Specify gravity	g/cm ³	3.14
Al ₂ O ₂	5.9	Specific surface area	cm ² /g	3510
Fe ₂ O ₂	3.4	Compressive strength	MPa	
CaO	59.8	3 days	-	23.3
SO ₃	4.3	28 days	-	46.2
MgO	2.9	Flexural strength	MPa	
Loss on ignition	0.6	3 days	-	4.2
		28 days	-	7.3
		Initial setting time	min	230

Table 2. The properties of sand, untreated and treated LWPB aggregate

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Table 3. Grading of treated and non-treated OPS aggregates

Sieve size (mm)	Cumulative % by weight passing sieve size			
	DS (12.5 mm)	TS (12.5 mm)	TDS (9.5 mm)	TTS (9.5 mm)
20	100	100	100	100
12.5	100	100	100	100
9.5	84.15	84.50	100	100
8	59.60	59.90	93.35	94.75
4.75	24.50	22.70	26.20	25.80
2.36	3.50	4.60	4.85	4.90

Table 4. The mix proportion of untreated and treated LWPA concrete (kg/m³)

Mix code	Cement	Silica fume	Water	W/C	Sand	SP	OPS	Temperature (°C)	Heating time (h)	Grout coating (W/C)
DS/0	490	25	154	0.3	908	6.2	355	Room temperature	0	0
TDS/0.6	490	25	154	0.3	908	6.2	425	75	0.5	0.6
TDS/0.8	490	25	154	0.3	908	6.2	410	75	0.5	0.8
TDS/1.0	490	25	154	0.3	908	6.2	395	75	0.5	1.0
TDS/1.2	490	25	154	0.3	908	6.2	380	75	0.5	1.2
TS/0	490	25	154	0.3	908	6.2	345	Room temperature	0	0
TTS/0.6	490	25	154	0.3	908	6.2	420	75	0.5	0.6
TTS/0.8	490	25	154	0.3	908	6.2	405	75	0.5	0.8
TTS/1.0	490	25	154	0.3	908	6.2	390	75	0.5	1.0
TTS/1.2	490	25	154	0.3	908	6.2	375	75	0.5	1.2