

## **APPENDIXES**

**APPENDIX A**  
**COMPRESSIVE STRENGTH RESULTS**

**Table A-1** Compressive strength of non-autoclaved aerated concrete at 7 days.

Specimens	Compressive strength (MPa)					
	1	2	3	4	5	Average
Reference	31.3	35.5	34.3	29.8	28.8	31.9±2.6
0.3	4.6	4.4	5.0	4.7	4.8	4.7±0.3
0.5	2.5	2.5	2.2	2.3	2.1	2.3±0.1
0.7	1.7	1.3	1.7	1.9	1.8	1.6±0.2
0.9	2.1	2.3	1.7	1.8	1.6	1.7±0.4

**Table A-2** Compressive strength of non-autoclaved aerated concrete incorporating RHA at 7 days.

Specimens	Compressive strength (MPa)					
	1	2	3	4	5	Average
Reference	8.76	7.57	8.51	7.94	8.23	8.20±0.42
RHC25	6.55	6.45	6.62	7.05	7.12	6.76±0.28
RHC50	5.81	5.77	6.30	5.69	5.76	5.89±0.22
RHC75	3.84	4.40	4.09	4.89	4.31	4.31±0.35
RHC100	3.25	3.55	3.86	3.59	3.38	3.56±0.21

**Table A-3** Compressive strength of non-autoclaved aerated concrete incorporating RHA at 14 days.

Specimens	Compressive strength (MPa)					
	1	2	3	4	5	Average
Reference	9.12	9.92	9.43	9.27	9.68	9.68±0.29
RHC25	8.92	8.22	8.22	7.95	8.59	8.38±0.34
RHC50	7.91	6.87	7.37	6.95	7.15	7.25±0.37
RHC75	6.41	6.50	6.50	6.38	6.21	6.40±0.11
RHC100	4.96	4.32	4.53	4.70	4.39	4.58±0.23

**Table A-4** Compressive strength of non-autoclaved aerated concrete incorporating RHA at 28 days.

Specimens	Compressive strength (MPa)					
	1	2	3	4	5	Average
Reference	11.73	12.13	11.68	12.77	13.13	12.29±0.57
RHC25	10.61	9.41	9.76	10.17	10.65	10.12±0.48
RHC50	8.39	9.47	8.24	8.50	7.63	8.45±0.59
RHC75	7.03	7.19	6.80	7.35	7.51	7.18±0.25
RHC100	5.34	5.42	4.95	5.47	5.40	5.32±0.19

**Table A-5** Compressive strength of autoclaved aerated concrete incorporating RHA at 140°C for 4 hr.

Specimens	Compressive strength (MPa)					
	1	2	3	4	5	Average
Reference	7.39	7.78	7.41	6.80	7.47	7.53±0.33
RHC25	6.35	5.93	6.73	6.93	6.53	6.34±0.35
RHC50	5.21	4.46	4.95	4.68	4.82	4.87±0.25
RHC75	3.11	3.90	3.85	3.74	3.66	3.62±0.28
RHC100	2.86	2.91	3.01	2.77	2.64	2.93±0.13

**Table A-6** Compressive strength of autoclaved aerated concrete incorporating RHA at 140°C for 8 hr.

Specimens	Compressive strength (MPa)					
	1	2	3	4	5	Average
Reference	8.32	8.96	8.27	9.30	9.42	8.85±0.48
RHC25	7.53	7.16	6.42	7.17	7.03	7.06±0.36
RHC50	5.51	5.56	5.20	5.11	5.25	5.33±0.18
RHC75	3.95	4.35	4.54	4.28	4.11	4.25±0.20
RHC100	3.72	3.81	3.88	4.02	3.64	3.81±0.13

**Table A-7** Compressive strength of autoclaved aerated concrete incorporating RHA at 140°C for 18 hr.

Specimens	Compressive strength (MPa)					
	1	2	3	4	5	Average
Reference	10.63	11.06	10.63	11.46	10.71	10.90±0.32
RHC25	8.80	8.94	8.52	9.54	8.37	8.83±0.41
RHC50	6.47	6.74	6.53	6.63	6.97	6.67±0.18
RHC75	5.76	5.66	5.34	6.10	5.70	5.71±0.24
RHC100	4.32	4.37	4.09	4.53	4.49	4.36±0.16

**Table A-8** Compressive strength of autoclaved aerated concrete incorporating RHA at 160°C for 4 hr.

Specimens	Compressive strength (MPa)					
	1	2	3	4	5	Average
Reference	9.03	8.92	8.74	9.34	9.27	9.06±0.22
RHC25	8.18	8.28	7.89	8.15	8.06	8.11±0.13
RHC50	6.12	6.53	6.92	6.34	6.92	6.57±0.32
RHC75	5.26	5.09	5.76	4.91	5.25	5.25±0.28
RHC100	3.52	3.56	3.32	3.78	3.70	3.55±0.16

**Table A-9** Compressive strength of autoclaved aerated concrete incorporating RHA at 160°C for 8 hr.

Specimens	Compressive strength (MPa)					
	1	2	3	4	5	Average
Reference	12.15	11.94	11.73	11.07	12.49	11.88±0.48
RHC25	9.08	8.86	9.37	9.37	9.27	9.19±0.20
RHC50	8.00	7.04	7.85	7.12	7.42	7.49±0.38
RHC75	5.77	6.45	6.68	6.26	6.97	6.55±0.04
RHC100	4.43	4.79	3.81	4.95	4.94	4.58±0.43

**Table A-10** Compressive strength of autoclaved aerated concrete incorporating RHA at 160°C for 18 hr.

Specimens	Compressive strength (MPa)					
	1	2	3	4	5	Average
Reference	13.06	12.93	13.73	13.32	13.67	13.34±0.32
RHC25	10.59	11.16	10.15	10.54	10.64	10.62±0.32
RHC50	8.56	7.48	7.89	8.35	8.18	8.09±0.38
RHC75	7.59	7.44	7.19	7.53	7.62	7.47±0.15
RHC100	4.78	4.96	5.11	5.14	5.50	5.10±0.24

**Table A-11** Compressive strength of autoclaved aerated concrete incorporating RHA at 180°C for 2 hr.

Specimens	Compressive strength (MPa)					
	1	2	3	4	5	Average
Reference	8.28	7.96	8.49	8.30	7.96	8.20±0.21
RHC25	7.18	6.63	7.8	7.30	7.25	7.15±0.27
RHC50	6.51	5.85	5.96	6.61	6.66	6.32±0.34
RHC75	5.20	4.77	5.26	5.91	5.24	5.28±0.37
RHC100	4.43	4.68	4.41	4.30	4.84	4.53±0.20

**Table A-12** Compressive strength of autoclaved aerated concrete incorporating RHA at 180°C for 4 hr.

Specimens	Compressive strength (MPa)					
	1	2	3	4	5	Average
Reference	13.12	13.51	13.24	12.84	13.46	13.23±0.24
RHC25	10.62	10.86	10.86	10.13	10.27	10.55±0.30
RHC50	7.86	8.21	8.28	8.03	7.76	8.03±0.20
RHC75	6.76	7.42	6.75	7.64	7.13	7.14±0.35
RHC100	4.81	5.53	5.27	4.87	5.34	5.16±0.28

**Table A-13** Compressive strength of autoclaved aerated concrete incorporating RHA at 180°C for 8 hr.

Specimens	Compressive strength (MPa)					
	1	2	3	4	5	Average
Reference	13.10	12.84	12.90	12.96	13.54	13.07±0.25
RHC25	10.93	10.40	10.87	10.58	10.89	10.73±0.21
RHC50	7.93	8.62	8.72	8.39	7.81	8.29±0.36
RHC75	7.42	7.71	6.80	7.35	6.46	7.15±0.45
RHC100	5.66	5.62	4.91	5.01	4.91	5.23±0.33

**Table A-14** Compressive strength of autoclaved aerated concrete incorporating RHA at 180°C for 18 hr.

Specimens	Compressive strength (MPa)					
	1	2	3	4	5	Average
Reference	13.43	13.29	13.26	14.19	13.58	13.55±0.34
RHC25	11.74	11.02	11.56	11.11	11.87	11.46±0.34
RHC50	8.56	7.91	7.78	8.41	8.33	8.20±0.30
RHC75	6.83	7.57	7.11	7.55	7.18	7.25±0.28
RHC100	5.24	4.96	4.91	5.57	5.64	5.26±0.30

**Table A-15** Compressive strength of autoclaved aerated concrete incorporating RHA and Al-containing waste at 180°C for 4 hr.

Specimens		Compressive strength (MPa)					
		1	2	3	4	5	Average
AWC/AWS	5	5.41	5.80	5.30	5.79	5.54	5.57±0.20
	10	4.26	4.01	3.41	4.53	4.01	4.04±0.37
	15	2.72	2.95	2.82	2.51	2.74	2.75±0.14
	20	2.22	1.97	1.86	1.94	2.13	2.02±0.13
AWC/AWM	5	7.21	7.64	7.35	7.14	7.11	7.29±0.19
	10	5.22	5.24	5.38	5.99	5.16	5.40±0.30
	15	5.24	4.94	4.99	5.45	4.69	5.06±0.26
	20	3.98	4.22	4.34	4.32	4.25	4.22±0.13
AWC/AWL	5	7.21	7.26	7.37	7.73	7.04	7.32±0.23
	10	6.52	6.32	6.66	6.20	5.95	6.33±0.25
	15	5.49	5.55	5.51	5.74	5.53	5.56±0.09
	20	4.44	3.80	4.30	4.12	4.56	4.24±0.26

**Table A-16** Compressive strength of autoclaved aerated concrete incorporating RHA and Al-containing waste at 180°C for 8 hr.

Specimens		Compressive strength (MPa)					
		1	2	3	4	5	Average
AWC/AWS	5	6.23	6.59	6.04	6.35	6.82	6.41±0.28
	10	4.72	5.65	5.12	4.50	5.36	5.07±0.42
	15	4.31	4.28	4.06	3.82	3.60	4.01±0.27
	20	3.57	3.52	3.54	4.08	3.43	3.63±0.23
AWC/AWM	5	7.32	7.24	7.55	7.32	7.82	7.45±0.21
	10	5.93	6.14	5.89	6.08	6.16	6.04±0.11
	15	5.98	5.25	5.34	5.45	5.42	5.49±0.26
	20	4.71	4.54	4.52	4.24	4.57	4.52±0.15
AWC/AWL	5	7.58	7.20	7.37	7.03	7.63	7.36±0.25
	10	6.16	6.20	6.34	6.56	6.57	6.36±0.19
	15	5.68	5.59	5.45	5.40	6.00	5.62±0.24
	20	4.06	4.22	4.31	4.61	4.18	4.28±0.21

**Table A-17** Compressive strength of autoclaved aerated concrete incorporating RHA and Al-containing waste at 180°C for 18 hr.

Specimens		Compressive strength (MPa)					
		1	2	3	4	5	Average
AWC/AWS	5	6.61	6.80	6.52	6.51	6.85	6.66±0.14
	10	5.37	5.91	5.20	5.36	5.79	5.53±0.27
	15	4.78	5.37	5.13	5.05	4.96	5.06±0.20
	20	3.86	4.16	3.97	3.79	4.03	3.96±0.13
AWC/AWM	5	7.61	7.50	7.43	7.64	7.21	7.48±0.15
	10	5.90	6.10	6.20	6.33	6.15	6.13±0.14
	15	5.56	5.57	5.65	5.37	5.44	5.52±0.10
	20	4.78	4.66	4.46	4.62	4.46	4.60±0.12
AWC/AWL	5	7.05	7.27	7.87	7.11	7.71	7.40±0.33
	10	6.39	6.20	6.27	6.48	6.07	6.28±0.14
	15	5.12	5.63	5.26	6.02	5.62	5.53±0.32
	20	4.85	4.71	5.01	4.63	4.14	4.67±0.29

**APPENDIX B**  
**DRY DENSITY RESULTS**

**Table B-1** Dry density of non-autoclaved aerated concrete at 7 days.

Specimens	Dry Density (kg/m <sup>3</sup> )					
	1	2	3	4	5	Average
Reference	1718	1721	1726	1728	1737	1726±7
0.3	1114	1146	1136	1133	1132	1132±12
0.5	1068	1048	1045	1058	1060	1074±11
0.7	1045	1027	1061	1021	1064	1044±17
0.9	1063	1046	1053	1042	1056	1052±7

**Table B-2** Dry density of non-autoclaved aerated concrete incorporating RHA at 28 days.

Specimens	Dry Density (kg/m <sup>3</sup> )					
	1	2	3	4	5	Average
Reference	1255	1250	1262	1257	1248	1254±5
RHC25	1041	1055	1052	1057	1043	1050±6
RHC50	872	890	887	871	882	880±8
RHC75	761	781	776	772	774	773±7
RHC100	668	689	675	674	673	676±7

**Table B-3** Dry density of autoclaved aerated concrete incorporating RHA at 140°C for 4 hr.

Specimens	Dry Density (kg/m <sup>3</sup> )					
	1	2	3	4	5	Average
Reference	1197	1199	1206	1193	1190	1197±5
RHC25	1037	1059	1068	1048	1060	1054±11
RHC50	907	898	885	880	887	891±10
RHC75	780	761	767	771	769	770±6
RHC100	677	664	658	671	669	668±6

**Table B-4** Dry density of autoclaved aerated concrete incorporating RHA at 140°C for 18 hr.

Specimens	Dry Density (kg/m <sup>3</sup> )					
	1	2	3	4	5	Average
Reference	1259	1224	1236	1242	1237	1240±11
RHC25	1019	1013	1016	1007	1015	1014±4
RHC50	868	894	877	871	879	878±9
RHC75	763	767	768	760	779	767±6
RHC100	685	682	680	691	690	686±4

**Table B-5** Dry density of autoclaved aerated concrete incorporating RHA at 160°C for 4 hr.

Specimens	Dry Density (kg/m <sup>3</sup> )					
	1	2	3	4	5	Average
Reference	1153	1183	1162	1169	1187	1171±13
RHC25	1012	1019	1002	1029	1011	1015±9
RHC50	862	864	873	871	878	870±6
RHC75	761	782	780	771	778	774±8
RHC100	712	699	682	697	691	696±10

**Table B-6** Dry density of autoclaved aerated concrete incorporating RHA at 160°C for 18 hr.

Specimens	Dry Density (kg/m <sup>3</sup> )					
	1	2	3	4	5	Average
Reference	1205	1165	1187	1193	1201	1190±14
RHC25	1015	1010	1019	1004	1016	1013±5
RHC50	880	879	869	881	876	877±4
RHC75	776	782	786	781	773	780±5
RHC100	689	690	682	694	681	687±5

**Table B-7** Dry density of autoclaved aerated concrete incorporating RHA at 180°C for 4 hr.

Specimens	Dry Density (kg/m <sup>3</sup> )					
	1	2	3	4	5	Average
Reference	1237	1228	1243	1227	1230	1233±6
RHC25	1025	1017	1011	1029	1009	1018±8
RHC50	864	877	861	885	861	870±10
RHC75	764	778	781	762	763	770±8
RHC100	682	687	676	693	669	681±8

**Table B-8** Dry density of autoclaved aerated concrete incorporating RHA at 180°C for 8 hr.

Specimens	Dry Density (kg/m <sup>3</sup> )					
	1	2	3	4	5	Average
Reference	1219	1203	1211	1202	1224	1212±9
RHC25	1026	1017	1014	1045	1038	1028±12
RHC50	892	882	878	895	881	886±7
RHC75	760	754	760	753	761	758±3
RHC100	679	674	671	676	670	674±3

**Table B-9** Dry density of autoclaved aerated concrete incorporating RHA at 180°C for 18 hr.

Specimens	Dry Density (kg/m <sup>3</sup> )					
	1	2	3	4	5	Average
Reference	1204	1207	1213	1209	1215	1210±4
RHC25	1046	1066	1074	1041	1048	1055±13
RHC50	873	869	891	869	877	876±8
RHC75	793	784	796	768	785	785±10
RHC100	711	708	678	682	694	695±13

**Table B-10** Dry density of autoclaved aerated concrete incorporating RHA and Al-containing waste at 180°C for 4 hr.

Specimens		Dry Density (kg/m <sup>3</sup> )					
		1	2	3	4	5	Average
AWC/AF	5	763	747	768	759	764	760±7
	10	752	747	740	741	746	745±4
	15	723	724	720	721	719	721±2
	20	694	700	691	696	694	695±3
AWC/AM	5	759	769	761	771	765	765±5
	10	752	733	737	731	744	739±8
	15	739	723	729	721	730	728±6
	20	717	722	711	718	725	719±5
AWC/AC	5	778	779	770	775	773	775±3
	10	762	762	768	769	761	764±3
	15	740	754	741	742	740	743±5
	20	743	746	744	734	731	740±6

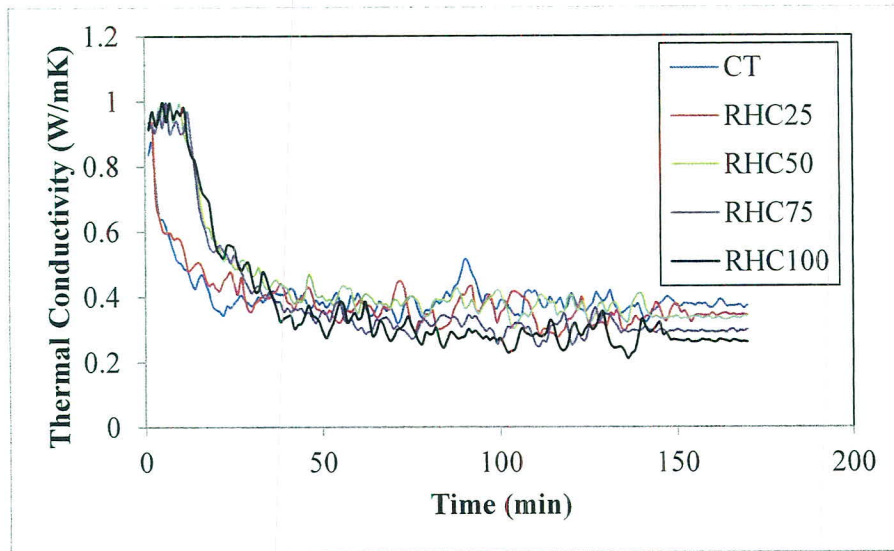
**Table B-11** Dry density of autoclaved aerated concrete incorporating RHA and Al-containing waste at 180°C for 8 hr.

Specimens		Dry Density (kg/m <sup>3</sup> )					
		1	2	3	4	5	Average
AWC/AF	5	752	762	763	755	750	756±5
	10	750	757	752	759	742	752±6
	15	739	741	740	749	731	740±6
	20	727	719	720	728	718	722±4
AWC/AM	5	740	753	747	747	748	749±5
	10	728	734	730	730	731	730±2
	15	776	761	778	778	760	771±8
	20	729	718	711	709	730	719±9
AWC/AC	5	770	781	771	771	788	777±7
	10	731	751	752	752	746	742±10
	15	715	732	722	724	739	726±8
	20	746	722	737	735	740	736±8

**Table B-12** Dry density of autoclaved aerated concrete incorporating RHA and Al-containing waste at 180°C for 18 hr.

Specimens		Dry Density (kg/m <sup>3</sup> )					
		1	2	3	4	5	Average
AWC/AF	5	737	747	739	741	743	741±3
	10	752	761	758	752	759	756±4
	15	738	740	735	734	747	739±5
	20	707	726	721	714	716	717±6
AWC/AM	5	756	764	761	758	756	759±3
	10	748	754	751	752	749	751±2
	15	720	734	729	721	732	727±6
	20	730	725	729	725	735	729±4
AWC/AC	5	770	763	771	767	762	767±4
	10	744	764	748	749	756	752±7
	15	747	740	739	736	741	741±4
	20	740	745	741	749	735	742±5

**APPENDIX C**  
**THERMAL CONDUCTIVITY RESULTS**



**Figure C-1** Thermal conductivity analysis of AAC at temperature of 180°C for 8 hr.

**APPENDIX D**  
**FLOW TABLE TESTING**

The method for determination of W/B ratio by flow table testing:

1. The mortar, which was prepared from each mix proportion, consists of the total weight of solid ingredients (except aluminium powder) about 500 g and the starting W/B ratio of 0.5% by weight of binder. The preparation of mortar was explained in Chapter 3.
2. The mortar is poured into the flow table flame in 2 parts. Each part is poked with steel rod 20 times. After that, the mortar is cut by a trowel for the smooth surface.
3. The flow table flame is removed, and then the cone of the flow table is rotated for lifting the flow table plate about 25 times during 15 sec.
4. The diameter of the expanded mortar is measured 4 times at each side and then averaged. This average value is used to calculate the percentage of flow mortar, as summarized in Equation D-1.
5. The W/B ratio of each mix proportion was determined until the percentage of flow mortar was  $110 \pm 5$ . Then, such a concentration of water at each mix proportion is added 10% by weight for containing good workability.

$$\frac{D_1 - D_0}{D_1} \times 100 \qquad \text{D-1}$$

Where  $D_0$  is diameter of flow table flame (mm)

$D_1$  is diameter of expanded mortar (mm)

**APPENDIX E**  
**STANDARDS**

**Table E-1** Physical requirement of AAC product [60].

Strength Class	Compressive Strength (MPa), min	Nominal Dry Bulk Density (kg/m <sup>3</sup> )	Density Limits (kg/m <sup>3</sup> )	Average Drying Shrinkage (%)
AAC-2	2.0	400	350-450	$\leq 0.02$
		500	450-550	
AAC-4	4.0	500	450-550	
		600	550-650	
		700	650-750	
AAC-6	6.0	600	550-650	
		700	650-750	
		800	750-850	