

# Cement Circular

Issue No. : 6/2024

Date : 06-Jan-2025

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Test results for the following cementitious materials

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\* The names of brands/ manufacturers are based on the information provided by the suppliers.

# Also named as "China Resources Cement 華潤水泥" in Cement Circular Issue No. 4/2015 and before.

For cementitious materials not included in the Cement Circular, ER may request PWCL to carry out test.

The above test results were uploaded to CEDD's web-site of <https://www.cedd.gov.hk/eng/public-services-forms/geotechnical/laboratory-testing/public-works-laboratories/index.html>

Should you have any questions regarding this Circular, please contact PTO/Lab2, Mr. H.L.Li, at telephone number 2305 1275, or submit your questions in writing to the Public Works Central Laboratory Building, 2B Cheung Yip Street, Kowloon Bay, Kowloon, Hong Kong (Attn: PTO/Lab2).

Laboratory Reference	2300118	2400001, 2400002	2400029, 2400030	2400061, 2400062	2400089, 2400090	2400117, 2400118	2400149, 2400150	BS EN 197-1:2011 Strength Class 52.5N  Specification
Date of Sample Received	3/11/2023	3/1/2024	1/3/2024	7/5/2024	28/6/2024	4/9/2024	4/11/2024	
Country of Origin Stated By Client	Japan	Japan	Japan	Japan	Japan	Japan	Japan	
<b>Physical Properties</b>								
Density (kg/m <sup>3</sup> )	3140	3140	3140	3150	3140	3150	3110	Not specified
Fineness : Specific surface (cm <sup>2</sup> /g)	3470	3450	3580	3420	3440	3500	3330	Not specified
Consistence : Standard consistence (%)	27.5	27.5	27.5	27.5	27.5	27.0	27.5	Not specified
Setting Time : Initial setting time (min)	165	170	185	170	180	185	185	Min.45 min
	Final setting time (min)	210	225	240	225	240	240	Not specified
Soundness (Le Chatelier) : Expansion (mm)	0.5	0.5	0.5	0.5	0.0	0.0	0.0	Max.10 mm
<b>Compressive Strength ( broken mortar prism ) :</b>								
Average 2 days strength (MPa)	27.0	26.2	26.3	23.2	23.4	24.2	27.0	Min. 20 MPa
Average 28 days strength (MPa)	65.8	66.8	67.1	64.4	63.0	66.7	67.4	Min. 52.5 MPa
<b>Flexural Strength ( mortar prism ) :</b>								
Average 2 days strength (MPa)	5.1	5.6	5.1	5.0	4.8	4.9	4.9	Not specified
Average 28 days strength (MPa)	8.7	8.4	9.2	8.5	8.9	9.6	9.4	Not specified
<b>Chemical Composition</b>								
Observed Mass Loss-on-ignition (%)	2.0	2.8	2.2	2.9	2.3	2.3	1.9	Max. 5.0%
Insoluble Residue (%)	0.6	<0.5	<0.5	<0.5	<0.5	0.6	<0.5	Max. 5.0%
Sulphate Content, expressed as SO <sub>3</sub> (%)	1.9	1.9	1.7	2.0	2.1	1.9	2.0	Max. 4.0%
Chloride Content (%)	0.01	0.03	0.02	0.03	0.01	0.03	0.01	Max. 0.10%
K <sub>2</sub> O (%)	0.35	0.39	0.41	0.39	0.77	0.36	0.34	---
Na <sub>2</sub> O (%)	0.25	0.27	0.26	0.24	0.12	0.36	0.22	---
Total Alkali ( Na <sub>2</sub> O Eq.) (%)	0.48	0.53	0.53	0.49	0.62	0.60	0.44	---

**2 Champion (一品牌水泥) / 台泥(英德)水泥有限公司**  
**(Portland Cement, Strength Class 52.5N)**

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Laboratory Reference	2300119	2400003, 2400004	2400031, 2400032	2400063, 2400064	2400091, 2400092	2400119, 2400120	2400151, 2400152	BS EN 197-1:2011 Strength Class 52.5N  Specification
Date of Sample Received	3/11/2023	3/1/2024	1/3/2024	7/5/2024	28/6/2024	4/9/2024	4/11/2024	
Country of Origin Stated By Client	Taiwan, China	Taiwan, China	Taiwan, China	Taiwan, China	Taiwan, China	China	China	
<b>Physical Properties</b>								
Density (kg/m <sup>3</sup> )	3110	3100	3090	3120	3140	3130	3110	Not specified
Fineness : Specific surface (cm <sup>2</sup> /g)	3530	3550	3900	3580	3510	3570	3430	Not specified
Consistence : Standard consistence (%)	27.5	27.5	28.0	27.5	27.5	27.0	27.0	Not specified
Setting Time : Initial setting time (min)	170	180	150	175	160	185	190	Min.45 min
	Final setting time (min)	225	225	225	225	210	225	240
Soundness (Le Chatelier) : Expansion (mm)	0.5	0.5	0.5	0.0	0.0	0.0	1.0	Max.10 mm
<b>Compressive Strength ( broken mortar prism ) :</b>								
Average 2 days strength (MPa)	27.6	29.6	32.2	28.5	26.9	26.6	28.1	Min. 20 MPa
Average 28 days strength (MPa)	62.6	58.8	62.0	60.7	55.7	63.8	65.2	Min. 52.5 MPa
<b>Flexural Strength ( mortar prism ) :</b>								
Average 2 days strength (MPa)	4.7	5.2	5.3	5.0	4.8	4.9	5.2	Not specified
Average 28 days strength (MPa)	8.1	8.5	8.8	9.0	8.4	8.9	8.6	Not specified
<b>Chemical Composition</b>								
Observed Mass Loss-on-ignition (%)	3.1	3.2	2.9	3.0	2.8	2.8	2.6	Max. 5.0%
Insoluble Residue (%)	1.2	0.7	0.7	0.6	1.2	0.9	0.6	Max. 5.0%
Sulphate Content, expressed as SO <sub>3</sub> (%)	2.5	2.7	2.5	2.6	3.1	2.7	2.8	Max. 4.0%
Chloride Content (%)	0.05	0.03	0.05	0.04	0.04	0.04	0.04	Max. 0.10%
K <sub>2</sub> O (%)	0.65	0.78	0.83	0.74	0.76	0.45	0.81	---
Na <sub>2</sub> O (%)	0.15	0.16	0.11	0.13	0.12	0.17	0.11	---
Total Alkali ( Na <sub>2</sub> O Eq.) (%)	0.58	0.68	0.66	0.62	0.62	0.46	0.64	---

**3 Feng Jiang (峰江牌水泥) / 佛山市高明高力發水泥有限公司**  
**(Portland Cement, Strength Class 52.5N)**

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Laboratory Reference	2300120	2400005, 2400006	2400033, 2400034	2400065, 2400066	2400093, 2400094	2400121, 2400122	2400153, 2400154	BS EN 197-1:2011 Strength Class 52.5N  Specification
Date of Sample Received	3/11/2023	3/1/2024	1/3/2024	7/5/2024	28/6/2024	4/9/2024	4/11/2024	
Country of Origin Stated By Client	China	China	China	China	China	China	China	
<b>Physical Properties</b>								
Density (kg/m <sup>3</sup> )	3090	3120	3130	3130	3100	3130	3110	Not specified
Fineness : Specific surface (cm <sup>2</sup> /g)	3780	3700	3790	3790	3760	3590	3470	Not specified
Consistence : Standard consistence (%)	27.5	27.5	27.0	27.0	27.0	27.0	27.0	Not specified
Setting Time : Initial setting time (min)	190	170	160	195	155	170	170	Min.45 min
	Final setting time (min)	240	225	210	225	195	225	225
Soundness (Le Chatelier) : Expansion (mm)	0.0	0.0	0.0	0.0	0.0	0.0	0.5	Max.10 mm
<b>Compressive Strength ( broken mortar prism ) :</b>								
Average 2 days strength (MPa)	24.2	29.1	26.0	24.7	23.9	23.3	24.4	Min. 20 MPa
Average 28 days strength (MPa)	64.2	58.8	61.5	64.5	61.8	62.2	64.2	Min. 52.5 MPa
<b>Flexural Strength ( mortar prism ) :</b>								
Average 2 days strength (MPa)	5.2	5.9	4.4	5.1	4.7	4.5	4.6	Not specified
Average 28 days strength (MPa)	8.2	7.8	9.1	7.8	8.0	7.9	7.1	Not specified
<b>Chemical Composition</b>								
Observed Mass Loss-on-ignition (%)	3.5	1.8	1.5	2.1	2.0	2.0	2.4	Max. 5.0%
Insoluble Residue (%)	1.1	0.7	<0.5	<0.5	0.8	1.5	<0.5	Max. 5.0%
Sulphate Content, expressed as SO <sub>3</sub> (%)	1.7	1.7	1.3	1.6	1.8	1.6	1.5	Max. 4.0%
Chloride Content (%)	0.04	0.05	0.04	0.04	0.03	0.04	0.04	Max. 0.10%
K <sub>2</sub> O (%)	0.45	0.55	0.44	0.43	0.42	0.46	0.41	---
Na <sub>2</sub> O (%)	<0.1	0.13	0.12	0.15	0.15	0.17	0.13	---
Total Alkali ( Na <sub>2</sub> O Eq.) (%)	0.38	0.49	0.41	0.43	0.43	0.47	0.40	---

Laboratory Reference	2300121	2400007, 2400008	2400035, 2400036	2400067, 2400068	2400095, 2400096	2400123, 2400124	2400155, 2400156	BS EN 197-1:2011 Strength Class 52.5N  Specification
Date of Sample Received	3/11/2023	3/1/2024	1/3/2024	7/5/2024	28/6/2024	4/9/2024	4/11/2024	
Country of Origin Stated By Client	Hong Kong SAR, China	Hong Kong SAR, China	Hong Kong SAR, China	Hong Kong SAR, China	Hong Kong SAR, China	Hong Kong SAR, China	Hong Kong SAR, China	
<b>Physical Properties</b>								
Density (kg/m <sup>3</sup> )	3080	3100	3110	3110	3100	3120	3070	Not specified
Fineness : Specific surface (cm <sup>2</sup> /g)	3840	3780	3660	3800	3800	3570	3550	Not specified
Consistence : Standard consistence (%)	28.0	27.0	28.0	27.5	27.0	27.0	27.5	Not specified
Setting Time : Initial setting time (min)	130	130	140	115	110	130	130	Min.45 min
	Final setting time (min)	165	165	165	165	150	165	195
Soundness (Le Chatelier) : Expansion (mm)	0.0	0.5	1.0	0.0	0.0	0.5	0.5	Max.10 mm
<b>Compressive Strength ( broken mortar prism ) :</b>								
Average 2 days strength (MPa)	21.8	22.8	24.7	22.4	21.3	21.7	24.0	Min. 20 MPa
Average 28 days strength (MPa)	60.8	62.5	60.7	59.9	55.9	59.6	63.3	Min. 52.5 MPa
<b>Flexural Strength ( mortar prism ) :</b>								
Average 2 days strength (MPa)	4.4	4.8	4.4	4.5	4.2	4.6	4.7	Not specified
Average 28 days strength (MPa)	8.4	8.2	7.8	8.3	8.3	7.3	8.2	Not specified
<b>Chemical Composition</b>								
Observed Mass Loss-on-ignition (%)	3.2	2.8	2.9	2.7	2.8	2.9	3.1	Max. 5.0%
Insoluble Residue (%)	1.8	1.2	0.7	1.3	1.3	1.3	1.0	Max. 5.0%
Sulphate Content, expressed as SO <sub>3</sub> (%)	2.2	2.3	2.3	2.4	3.2	2.2	2.4	Max. 4.0%
Chloride Content (%)	<0.01	<0.01	0.01	0.01	<0.01	0.01	0.01	Max. 0.10%
K <sub>2</sub> O (%)	0.63	0.65	0.72	0.56	0.56	0.66	0.67	---
Na <sub>2</sub> O (%)	<0.1	0.11	0.1	0.14	<0.1	0.15	0.11	---
Total Alkali ( Na <sub>2</sub> O Eq.) (%)	0.51	0.54	0.58	0.51	0.45	0.58	0.55	---

Laboratory Reference	2300122	2400009, 2400010	2400037, 2400038	2400069, 2400070	2400097, 2400098	2400125, 2400126	2400157, 2400158	BS EN 197-1:2011 Strength Class 52.5N  Specification
Date of Sample Received	3/11/2023	3/1/2024	1/3/2024	7/5/2024	28/6/2024	4/9/2024	4/11/2024	
Country of Origin Stated By Client	Japan	Japan	Japan	Japan	Japan	Japan	Japan	
<b>Physical Properties</b>								
Density (kg/m <sup>3</sup> )	3150	3150	3150	3140	3120	3140	3130	Not specified
Fineness : Specific surface (cm <sup>2</sup> /g)	3570	3550	3350	3570	3560	3660	3390	Not specified
Consistence : Standard consistence (%)	27.0	26.5	26.0	27.0	26.5	27.0	27.0	Not specified
Setting Time : Initial setting time (min)	165	160	155	150	160	180	160	Min.45 min
	Final setting time (min)	225	210	210	210	210	225	225
Soundness (Le Chatelier) : Expansion (mm)	0.5	0.0	0.5	0.5	0.0	0.0	0.5	Max.10 mm
<b>Compressive Strength ( broken mortar prism ) :</b>								
Average 2 days strength (MPa)	26.0	25.6	22.7	29.7	25.7	25.2	24.3	Min. 20 MPa
Average 28 days strength (MPa)	61.9	60.8	60.9	66.7	62.5	62.7	66.0	Min. 52.5 MPa
<b>Flexural Strength ( mortar prism ) :</b>								
Average 2 days strength (MPa)	5.5	4.8	4.3	5.5	4.8	4.9	4.7	Not specified
Average 28 days strength (MPa)	9.0	8.7	8.9	8.4	8.8	9.1	9.1	Not specified
<b>Chemical Composition</b>								
Observed Mass Loss-on-ignition (%)	3.0	3.0	2.9	2.9	2.6	2.8	2.7	Max. 5.0%
Insoluble Residue (%)	0.7	<0.5	<0.5	<0.5	0.7	1.3	<0.5	Max. 5.0%
Sulphate Content, expressed as SO <sub>3</sub> (%)	2.0	2.0	1.9	2.2	2.3	2.1	2.3	Max. 4.0%
Chloride Content (%)	0.02	0.03	0.02	0.04	0.02	0.03	0.03	Max. 0.10%
K <sub>2</sub> O (%)	0.41	0.41	0.41	0.52	0.44	0.46	0.44	---
Na <sub>2</sub> O (%)	0.25	0.29	0.24	0.10	0.26	0.28	0.24	---
Total Alkali ( Na <sub>2</sub> O Eq.) (%)	0.52	0.56	0.51	0.44	0.55	0.58	0.54	---

**6 Yue Xiu (粤秀牌水泥) / Guanzhou Zhujiang Cement Co., Ltd.**  
**(Portland Cement, Strength Class 52.5N)**

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Laboratory Reference	2300123	2400011, 2400012	2400039, 2400040	2400071, 2400072	2400099, 2400100	2400127, 2400128	2400159, 2400160	BS EN 197-1:2011 Strength Class 52.5N  Specification
Date of Sample Received	3/11/2023	3/1/2024	1/3/2024	7/5/2024	28/6/2024	4/9/2024	4/11/2024	
Country of Origin Stated By Client	China	China	China	China	China	China	China	
<b>Physical Properties</b>								
Density (kg/m <sup>3</sup> )	3150	3160	3160	3170	3130	3150	3150	Not specified
Fineness : Specific surface (cm <sup>2</sup> /g)	3880	3870	3990	3920	3940	3950	3790	Not specified
Consistence : Standard consistence (%)	26.0	26.5	26.0	27.0	26.5	27.0	28.0	Not specified
Setting Time : Initial setting time (min)	130	140	170	150	140	145	185	Min.45 min
Final setting time (min)	165	180	210	195	195	180	225	Not specified
Soundness (Le Chatelier) : Expansion (mm)	0.5	0.5	1.0	0.5	0.5	0.0	0.0	Max.10 mm
<b>Compressive Strength ( broken mortar prism ) :</b>								
Average 2 days strength (MPa)	29.5	35.2	30.7	31.6	26.8	27.1	34.3	Min. 20 MPa
Average 28 days strength (MPa)	58.9	61.3	58.2	58.8	60.2	60.6	59.7	Min. 52.5 MPa
<b>Flexural Strength ( mortar prism ) :</b>								
Average 2 days strength (MPa)	5.4	6.1	5.1	5.5	5.3	5.0	5.6	Not specified
Average 28 days strength (MPa)	8.3	8.4	8.2	8.2	8.4	8.3	8.0	Not specified
<b>Chemical Composition</b>								
Observed Mass Loss-on-ignition (%)	2.1	2.0	1.9	1.8	1.2	1.3	1.0	Max. 5.0%
Insoluble Residue (%)	0.9	0.6	<0.5	<0.5	0.6	<0.5	<0.5	Max. 5.0%
Sulphate Content, expressed as SO <sub>3</sub> (%)	2.8	2.9	2.4	2.9	2.5	2.9	3.2	Max. 4.0%
Chloride Content (%)	0.02	0.02	0.04	0.03	0.02	0.03	0.02	Max. 0.10%
K <sub>2</sub> O (%)	0.60	0.67	0.64	0.70	0.70	0.72	0.71	---
Na <sub>2</sub> O (%)	<0.1	0.12	<0.1	<0.1	<0.1	0.11	<0.1	---
Total Alkali ( Na <sub>2</sub> O Eq.) (%)	0.46	0.56	0.48	0.50	0.51	0.58	0.54	---

Laboratory Reference	2300124	2400013, 2400014	2400041, 2400042	2400073, 2400074	2400101, 2400102	2400129, 2400130	2400161, 2400162	BS EN 197-1:2011 Strength Class 52.5N  Specification
Date of Sample Received	3/11/2023	3/1/2024	1/3/2024	7/5/2024	28/6/2024	4/9/2024	4/11/2024	
Country of Origin Stated By Client	China	China	China	China	China	China	China	
<b>Physical Properties</b>								
Density (kg/m <sup>3</sup> )	3150	3130	3140	3150	3130	3160	3140	Not specified
Fineness : Specific surface (cm <sup>2</sup> /g)	4180	4220	4230	4160	4190	4040	3900	Not specified
Consistence : Standard consistence (%)	27.0	26.0	27.0	27.0	27.0	27.0	27.0	Not specified
Setting Time : Initial setting time (min)	145	150	150	135	155	150	160	Min.45 min
	Final setting time (min)	195	195	225	180	210	195	195
Soundness (Le Chatelier) : Expansion (mm)	1.0	1.0	1.0	0.0	0.5	0.0	0.5	Max.10 mm
<b>Compressive Strength ( broken mortar prism ) :</b>								
Average 2 days strength (MPa)	26.6	25.9	26.6	28.2	24.5	25.8	26.8	Min. 20 MPa
Average 28 days strength (MPa)	65.6	64.7	65.4	66.1	63.6	63.7	68.6	Min. 52.5 MPa
<b>Flexural Strength ( mortar prism ) :</b>								
Average 2 days strength (MPa)	4.8	4.4	4.9	5.0	5.0	5.3	5.0	Not specified
Average 28 days strength (MPa)	8.7	8.5	8.8	8.4	8.2	8.5	8.0	Not specified
<b>Chemical Composition</b>								
Observed Mass Loss-on-ignition (%)	1.6	2.8	1.9	2.0	1.9	2.0	2.3	Max. 5.0%
Insoluble Residue (%)	0.6	0.9	<0.5	<0.5	0.9	0.8	0.7	Max. 5.0%
Sulphate Content, expressed as SO <sub>3</sub> (%)	2.4	2.3	2.3	2.2	2.5	2.3	2.4	Max. 4.0%
Chloride Content (%)	0.02	0.03	0.04	0.05	0.04	0.05	0.03	Max. 0.10%
K <sub>2</sub> O (%)	0.29	0.36	0.31	0.41	0.36	0.41	0.43	---
Na <sub>2</sub> O (%)	<0.1	0.15	<0.1	0.12	0.12	0.17	<0.1	---
Total Alkali ( Na <sub>2</sub> O Eq.) (%)	0.28	0.38	0.29	0.39	0.36	0.44	0.34	---



Laboratory Reference	2300125	2400015, 2400016	2400043, 2400044	2400075, 2400076	2400103, 2400104	2400131, 2400132	2400163, 2400164	BS3892:Part 1: 1997  Specification
Date of Sample Received	3/11/2023	3/1/2024	1/3/2024	7/5/2024	28/6/2024	4/9/2024	4/11/2024	
Country of Origin Stated By Client	Hong Kong SAR, China	Hong Kong SAR, China	Hong Kong SAR, China	Hong Kong SAR, China	Hong Kong SAR, China	Hong Kong SAR, China	Hong Kong SAR, China	
<b>Physical Properties</b>								
Fineness (%)	9.7	9.5	9.4	7.1	8.8	7.7	8.1	Not more than 12%
Particle Density (kg/m <sup>3</sup> )	2400	2650	2590	2610	2500	2620	2620	Not less than 2000 kg/m <sup>3</sup>
Water Requirement (%)	90	90	90	90	90	90	88	^Note (1)
Strength Factor ---	0.82	0.92	0.90	0.90	0.91	1.06	1.08	^Note (1)
Standard Consistence (%)	25.0	24.0	24.5	24.5	25.0	24.5	25.0	---
Initial Setting Time (min)	245	250	225	225	215	220	190	Not less than the initial setting time of the Portland cement used
Soundness (mm)	0.5	0.5	0.0	0.0	0.5	0.0	0.0	Not more than 10 mm
<b>Portland Cement used</b>								
Brand	Champion	Champion	Champion	Champion	Champion	Champion	Champion	---
Lab. Reference No.	2300062	2300119	2300119	2400031, 2400032	2400031, 2400032	2400091, 2400092	2400091, 2400092	---
Initial Setting Time (min)	160	170	170	150	150	160	160	---
<b>Chemical Composition</b>								
Moisture Content (%)	0.3	0.2	0.1	0.3	0.1	<0.1	<0.1	Not more than 0.5%
Loss-on-ignition (%)	1.4	0.6	0.6	0.8	1.1	0.7	0.6	Not more than 7%
Sulphate Content, expressed as SO <sub>3</sub> (%)	1.1	1.2	1.3	1.3	1.5	1.6	1.4	Not more than 2.0%
Chloride Content (%)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	Not more than 0.1%
Calcium Oxide Content (%)	7.3	14.0	14.0	10.8	13.1	12.1	12.7	Not more than 10.0%
K <sub>2</sub> O (%)	1.1	1.2	1.2	1.4	1.2	1.5	1.4	---
Na <sub>2</sub> O (%)	1.9	2.0	1.7	2.0	2.1	1.8	1.5	---
Total Alkali ( Na <sub>2</sub> O Eq.) (%)	2.6	2.8	2.5	3.0	2.8	2.7	2.4	---

^Note: (1) In accordance with GS16.07(b), the criteria for water requirement and strength factor at 28 days shall not apply, but the values of water requirement and strength factor at 28 days shall be reported.

**9 Hung Lee (鴻利牌煤灰) / Dongguan Hung Lee PFA Ltd.  
(Pulverised-fuel Ash)**

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Laboratory Reference	2300126	2400017, 2400018	2400045, 2400046	2400077, 2400078	2400105, 2400106	2400133, 2400134	2400165, 2400166	BS3892:Part 1: 1997  Specification
Date of Sample Received	3/11/2023	3/1/2024	1/3/2024	7/5/2024	28/6/2024	4/9/2024	4/11/2024	
Country of Origin Stated By Client	China	China	China	China	China	China	China	
<b>Physical Properties</b>								
Fineness (%)	16.8	10.1	4.9	5.3	16.6	2.1	3.6	Not more than 12%
Particle Density (kg/m <sup>3</sup> )	2290	2400	2490	2500	2390	2430	2450	Not less than 2000 kg/m <sup>3</sup>
Water Requirement (%)	93	93	89	89	91	90	91	^Note (1)
Strength Factor ---	0.73	0.86	0.88	0.83	0.85	0.92	0.93	^Note (1)
Standard Consistence (%)	26.0	26.0	26.0	25.5	26.0	27.0	27.0	---
Initial Setting Time (min)	240	260	260	285	240	280	230	Not less than the initial setting time of the Portland cement used
Soundness (mm)	0.0	0.5	0.5	0.5	0.0	0.0	0.5	Not more than 10 mm
<b>Portland Cement used</b>								
Brand	Champion	Champion	Champion	Champion	Champion	Champion	Champion	---
Lab. Reference No.	2300062	2300119	2300119	2400031, 2400032	2400031, 2400032	2400091, 2400092	2400091, 2400092	---
Initial Setting Time (min)	160	170	170	150	150	160	160	---
<b>Chemical Composition</b>								
Moisture Content (%)	<0.1	<0.1	<0.1	0.2	<0.1	<0.1	<0.1	Not more than 0.5%
Loss-on-ignition (%)	8.2	<0.5	0.7	1.1	1.4	2.2	1.1	Not more than 7%
Sulphate Content, expressed as SO <sub>3</sub> (%)	<0.5	<0.5	0.8	0.5	0.8	0.6	<0.5	Not more than 2.0%
Chloride Content (%)	< 0.05	< 0.05	< 0.05	<0.05	<0.05	<0.05	<0.05	Not more than 0.1%
Calcium Oxide Content (%)	2.4	13.0	9.1	7.1	7.3	7.9	6.6	Not more than 10.0%
K <sub>2</sub> O (%)	3.0	1.4	1.5	1.7	1.5	1.5	1.9	---
Na <sub>2</sub> O (%)	0.5	1.6	1.0	1.1	1.2	1.1	1.0	---
Total Alkali ( Na <sub>2</sub> O Eq.) (%)	2.5	2.5	2.0	2.2	2.2	2.1	2.3	---

^Note: (1) In accordance with GS16.07(b), the criteria for water requirement and strength factor at 28 days shall not apply, but the values of water requirement and strength factor at 28 days shall be reported.

Laboratory Reference	2300127	2400019, 2400020	2400047, 2400048	2400079, 2400080	2400107, 2400108	2400135, 2400136	2400167, 2400168	BS3892:Part 1: 1997
Date of Sample Received	3/11/2023	3/1/2024	1/3/2024	7/5/2024	28/6/2024	4/9/2024	4/11/2024	
Country of Origin Stated By Client	Hong Kong SAR, China	Hong Kong SAR, China	Hong Kong SAR, China	Hong Kong SAR, China	Hong Kong SAR, China	Hong Kong SAR, China	Hong Kong SAR, China	Specification
<b>Physical Properties</b>								
Fineness (%)	12.1	9.8	10.6	10.1	8.3	8.7	12.3	Not more than 12%
Particle Density (kg/m <sup>3</sup> )	2390	2390	2410	2440	2360	2360	2340	Not less than 2000 kg/m <sup>3</sup>
Water Requirement (%)	95	95	93	96	96	96	96	^Note (1)
Strength Factor ---	0.77	0.75	0.77	0.75	0.80	0.90	0.90	^Note (1)
Standard Consistence (%)	29.0	28.5	28.5	29.0	29.0	29.0	28.0	---
Initial Setting Time (min)	240	250	225	230	190	195	225	Not less than the initial setting time of the Portland cement used
Soundness (mm)	0.5	1.0	0.0	0.5	0.0	0.0	0.0	Not more than 10 mm
<b>Portland Cement used</b>								
Brand	Champion	Champion	Champion	Champion	Champion	Champion	Champion	---
Lab. Reference No.	2300062	2300119	2300119	2400031, 2400032	2400031, 2400032	2400091, 2400092	2400091, 2400092	---
Initial Setting Time (min)	160	170	170	150	150	160	160	---
<b>Chemical Composition</b>								
Moisture Content (%)	0.1	0.1	0.2	0.3	0.2	0.1	<0.1	Not more than 0.5%
Loss-on-ignition (%)	2.4	2.0	2.1	2.3	1.8	1.5	1.3	Not more than 7%
Sulphate Content, expressed as SO <sub>3</sub> (%)	0.7	0.6	0.6	0.6	<0.5	0.60	0.50	Not more than 2.0%
Chloride Content (%)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	Not more than 0.1%
Calcium Oxide Content (%)	6.8	5.6	6.6	7.0	5.1	5.2	7.1	Not more than 10.0%
K <sub>2</sub> O (%)	1.0	1.2	1.2	0.9	0.9	0.9	1.0	---
Na <sub>2</sub> O (%)	0.9	1.2	1.1	0.8	0.6	0.6	1.0	---
Total Alkali ( Na <sub>2</sub> O Eq.) (%)	1.5	2.1	1.9	1.4	1.2	1.2	1.6	---

^Note: (1) In accordance with GS16.07(b), the criteria for water requirement and strength factor at 28 days shall not apply, but the values of water requirement and strength factor at 28 days shall be reported.

**11 Redland (東莞煤灰) / Sha Kok Power Station Plant C - Dong Guan PRC  
(Pulverised-fuel Ash)**

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Laboratory Reference	2300128	2400021, 2400022	2400049, 2400050	2400081, 2400082	2400109, 2400110	2400137, 2400138	2400169, 2400170	BS3892:Part 1: 1997  Specification
Date of Sample Received	3/11/2023	3/1/2024	1/3/2024	7/5/2024	28/6/2024	4/9/2024	4/11/2024	
Country of Origin Stated By Client	China	China	China	China	China	China	China	
<b>Physical Properties</b>								
Fineness (%)	14.1	11.2	8.0	8.5	4.6	4.6	5.0	Not more than 12%
Particle Density (kg/m <sup>3</sup> )	2290	2270	2470	2360	2470	2570	2450	Not less than 2000 kg/m <sup>3</sup>
Water Requirement (%)	94	93	91	91	91	90	96	^Note (1)
Strength Factor ---	0.78	0.82	0.86	0.80	0.84	0.97	0.95	^Note (1)
Standard Consistence (%)	28.0	27.0	26.0	26.0	25.5	25.5	28.0	---
Initial Setting Time (min)	250	240	255	220	180	210	210	Not less than the initial setting time of the Portland cement used
Soundness (mm)	0.5	0.5	0.5	0.5	0.0	0.0	0.0	Not more than 10 mm
<b>Portland Cement used</b>								
Brand	Champion	Champion	Champion	Champion	Champion	Champion	Champion	---
Lab. Reference No.	2300062	2300119	2300119	2400031, 2400032	2400031, 2400032	2400091, 2400092	2400091, 2400092	---
Initial Setting Time (min)	160	170	170	150	150	160	160	---
<b>Chemical Composition</b>								
Moisture Content (%)	0.1	<0.1	<0.1	0.2	0.1	<0.1	0.1	Not more than 0.5%
Loss-on-ignition (%)	1.3	<0.5	<0.5	0.6	1.0	1.2	1.2	Not more than 7%
Sulphate Content, expressed as SO <sub>3</sub> (%)	1.0	<0.5	1.1	0.8	1.0	1.2	0.8	Not more than 2.0%
Chloride Content (%)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	Not more than 0.1%
Calcium Oxide Content (%)	5.8	5.7	10.0	9.9	7.8	10.7	8.6	Not more than 10.0%
K <sub>2</sub> O (%)	1.2	1.5	1.3	1.1	1.5	1.4	1.0	---
Na <sub>2</sub> O (%)	0.8	1.3	0.9	1.6	1.4	0.9	1.5	---
Total Alkali ( Na <sub>2</sub> O Eq.) (%)	1.7	2.3	1.7	2.3	2.4	1.8	2.2	---

^Note: (1) In accordance with GS16.07(b), the criteria for water requirement and strength factor at 28 days shall not apply, but the values of water requirement and strength factor at 28 days shall be reported.

**12 Green Slag / Green Island Cement Co., Ltd.**  
**(Ground granulated blast furnace slag)**

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Laboratory Reference	2300012	2400001, 2400002	2400003, 2400004	2400007, 2400008	2400009, 2400010	2400011, 2400012	2400013, 2400014	BS EN 15167-1:2006	
Date of Sample Received	3/11/2023	3/1/2024	1/3/2024	7/5/2024	28/6/2024	4/9/2024	4/11/2024		
Country of Origin Stated By Client	Hong Kong SAR, China	Hong Kong SAR, China	Hong Kong SAR, China	Hong Kong SAR, China	Hong Kong SAR, China	Hong Kong SAR, China	Hong Kong SAR, China		Specification
<b>Physical Properties</b>									
Standard Consistence (%)	30.0	30.0	30.0	30.0	30.0	30.0	30.0	Not specified $\leq$ twice of initial setting time for Portland cement used	
Initial Setting Time (min)	165	180	165	175	170	180	200		
Density (kg/m <sup>3</sup> )	2860	2880	2870	2880	2860	2860	2870		Not specified
Fineness : Specific surface (m <sup>2</sup> /kg)	478	472	487	491	486	479	491		$\geq$ 275 m <sup>2</sup> /kg
Activity Index :									
7 days (%)	50	60	63	55	54	60	64	$\geq$ 45 %	
28 days (%)	86	83	91	90	87	89	104	$\geq$ 70 %	
Portland Cement used									
Brand	Special Green Island	Special Green Island	Special Green Island	Special Green Island	Special Green Island	Champion	Champion	---	
Lab. Reference No.	2300065	2300121	2300121	2400035, 2400036	2400035, 2400036	2400091, 2400092	2400091, 2400092	---	
Initial Setting Time (min)	115	130	130	140	140	160	160	---	
<b>Chemical Composition</b>									
Loss-on-ignition (%)	1.5	1.2	1.3	1.5	<0.5	1.4	0.6	$\leq$ 3.0%	
Sulphate Content, expressed as SO <sub>3</sub> (%)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	$\leq$ 2.5%	
Chloride Content (%)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	$\leq$ 0.10%	
Magnesium Oxide Content (%)	5.6	5.8	5.6	5.9	5.2	5.4	5.0	$\leq$ 18%	
Moisture Content (%)	0.2	<0.2	0.2	0.3	<0.2	0.3	<0.2	$\leq$ 1.0%	
Sulphide Content (%)	<0.7	0.8	0.9	0.7	0.9	0.9	1.1	$\leq$ 2.0%	