

# Cement Circular

Issue No. : 4/2024

Date : 04-Sep-2024

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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).

**1 Asano / Taiheiyo Cement Corporation**  
**(Portland Cement, Strength Class 52.5N)**

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Laboratory Reference	2300061	2300091	2300118	2400001, 2400002	2400029, 2400030	2400061, 2400062	2400089, 2400090	BS EN 197-1:2000/2011 Strength Class 52.5N Specification
Date of Sample Received	10/7/2023	11/9/2023	3/11/2023	3/1/2024	1/3/2024	7/5/2024	28/6/2024	
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	3140	3140	3140	3150	3140	Not specified
Fineness : Specific surface (cm <sup>2</sup> /g)	3230	3200	3470	3450	3580	3420	3440	Not specified
Consistence : Standard consistence (%)	27.0	27.0	27.5	27.5	27.5	27.5	27.5	Not specified
Setting Time : Initial setting time (min)	155	150	165	170	185	170	180	Min.45 min
Final setting time (min)	210	210	210	225	240	225	240	Not specified
Soundness (Le Chatelier) : Expansion (mm)	0.0	0.0	0.5	0.5	0.5	0.5	0.0	Max.10 mm
<b>Compressive Strength ( broken mortar prism ) :</b>								
Average 2 days strength (MPa)	24.0	26.4	27.0	26.2	26.3	23.2	23.4	Min. 20 MPa
Average 28 days strength (MPa)	62.2	68.0	65.8	66.8	67.1	64.4	63.0	Min. 52.5 MPa
<b>Flexural Strength ( mortar prism ) :</b>								
Average 2 days strength (MPa)	4.9	5.3	5.1	5.6	5.1	5.0	4.8	Not specified
Average 28 days strength (MPa)	8.6	8.6	8.7	8.4	9.2	8.5	8.9	Not specified
<b>Chemical Composition</b>								
Observed Mass Loss-on-ignition (%)	2.4	2.5	2.0	2.8	2.2	2.9	2.3	Max. 5.0%
Insoluble Residue (%)	<0.5	0.8	0.6	<0.5	<0.5	<0.5	<0.5	Max. 5.0%
Sulphate Content, expressed as SO <sub>3</sub> (%)	1.7	1.9	1.9	1.9	1.7	2.0	2.1	Max. 4.0%
Chloride Content (%)	0.02	0.02	0.01	0.03	0.02	0.03	0.01	Max. 0.10%
K <sub>2</sub> O (%)	0.40	0.40	0.35	0.39	0.41	0.39	0.77	---
Na <sub>2</sub> O (%)	0.20	0.20	0.25	0.27	0.26	0.24	0.12	---
Total Alkali ( Na <sub>2</sub> O Eq.) (%)	0.47	0.46	0.48	0.53	0.53	0.49	0.62	---

**2 Champion (一品牌水泥) / Taiwan Cement Corporation  
(Portland Cement, Strength Class 52.5N)**

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Laboratory Reference	2300062	2300092	2300119	2400003, 2400004	2400031, 2400032	2400063, 2400064	2400091, 2400092	BS EN 197-1:2000/2011 Strength Class 52.5N  Specification
Date of Sample Received	10/7/2023	11/9/2023	3/11/2023	3/1/2024	1/3/2024	7/5/2024	28/6/2024	
Country of Origin Stated By Client	Taiwan, China	Taiwan, China	Taiwan, China	Taiwan, China	Taiwan, China	Taiwan, China	Taiwan, China	
<b>Physical Properties</b>								
Density (kg/m <sup>3</sup> )	3120	3100	3110	3100	3090	3120	3140	Not specified
Fineness : Specific surface (cm <sup>2</sup> /g)	3210	3160	3530	3550	3900	3580	3510	Not specified
Consistence : Standard consistence (%)	27.0	27.5	27.5	27.5	28.0	27.5	27.5	Not specified
Setting Time : Initial setting time (min)	160	190	170	180	150	175	160	Min.45 min
	Final setting time (min)	210	240	225	225	225	210	Not specified
Soundness (Le Chatelier) : Expansion (mm)	0.0	0.5	0.5	0.5	0.5	0.0	0.0	Max.10 mm
<b>Compressive Strength ( broken mortar prism ) :</b>								
Average 2 days strength (MPa)	27.7	31.2	27.6	29.6	32.2	28.5	26.9	Min. 20 MPa
Average 28 days strength (MPa)	66.1	65.3	62.6	58.8	62.0	60.7	55.7	Min. 52.5 MPa
<b>Flexural Strength ( mortar prism ) :</b>								
Average 2 days strength (MPa)	5.0	5.3	4.7	5.2	5.3	5.0	4.8	Not specified
Average 28 days strength (MPa)	7.6	8.4	8.1	8.5	8.8	9.0	8.4	Not specified
<b>Chemical Composition</b>								
Observed Mass Loss-on-ignition (%)	2.9	3.0	3.1	3.2	2.9	3.0	2.8	Max. 5.0%
Insoluble Residue (%)	0.9	1.4	1.2	0.7	0.7	0.6	1.2	Max. 5.0%
Sulphate Content, expressed as SO <sub>3</sub> (%)	2.5	2.7	2.5	2.7	2.5	2.6	3.1	Max. 4.0%
Chloride Content (%)	0.05	0.05	0.05	0.03	0.05	0.04	0.04	Max. 0.10%
K <sub>2</sub> O (%)	0.69	0.68	0.65	0.78	0.83	0.74	0.76	---
Na <sub>2</sub> O (%)	<0.1	<0.1	0.15	0.16	0.11	0.13	0.12	---
Total Alkali ( Na <sub>2</sub> O Eq.) (%)	0.55	0.53	0.58	0.68	0.66	0.62	0.62	---

**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	2300063	2300093	2300120	2400005, 2400006	2400033, 2400034	2400065, 2400066	2400093, 2400094	BS EN 197-1:2000/2011 Strength Class 52.5N  Specification
Date of Sample Received	10/7/2023	11/9/2023	3/11/2023	3/1/2024	1/3/2024	7/5/2024	28/6/2024	
Country of Origin Stated By Client	China	China	China	China	China	China	China	
<b>Physical Properties</b>								
Density (kg/m <sup>3</sup> )	3120	3100	3090	3120	3130	3130	3100	Not specified
Fineness : Specific surface (cm <sup>2</sup> /g)	3410	3320	3780	3700	3790	3790	3760	Not specified
Consistence : Standard consistence (%)	27.0	27.0	27.5	27.5	27.0	27.0	27.0	Not specified
Setting Time : Initial setting time (min)	160	175	190	170	160	195	155	Min.45 min
Final setting time (min)	210	210	240	225	210	225	195	Not specified
Soundness (Le Chatelier) : Expansion (mm)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Max.10 mm
<b>Compressive Strength ( broken mortar prism ) :</b>								
Average 2 days strength (MPa)	23.1	26.3	24.2	29.1	26.0	24.7	23.9	Min. 20 MPa
Average 28 days strength (MPa)	59.9	62.2	64.2	58.8	61.5	64.5	61.8	Min. 52.5 MPa
<b>Flexural Strength ( mortar prism ) :</b>								
Average 2 days strength (MPa)	4.7	4.6	5.2	5.9	4.4	5.1	4.7	Not specified
Average 28 days strength (MPa)	7.6	7.6	8.2	7.8	9.1	7.8	8.0	Not specified
<b>Chemical Composition</b>								
Observed Mass Loss-on-ignition (%)	2.8	2.7	3.5	1.8	1.5	2.1	2.0	Max. 5.0%
Insoluble Residue (%)	0.7	2.2	1.1	0.7	<0.5	<0.5	0.8	Max. 5.0%
Sulphate Content, expressed as SO <sub>3</sub> (%)	1.7	1.4	1.7	1.7	1.3	1.6	1.8	Max. 4.0%
Chloride Content (%)	0.03	0.04	0.04	0.05	0.04	0.04	0.03	Max. 0.10%
K <sub>2</sub> O (%)	0.56	0.56	0.45	0.55	0.44	0.43	0.42	---
Na <sub>2</sub> O (%)	<0.1	<0.1	<0.1	0.13	0.12	0.15	0.15	---
Total Alkali ( Na <sub>2</sub> O Eq.) (%)	0.44	0.41	0.38	0.49	0.41	0.43	0.43	---

Laboratory Reference	2300065	2300095	2300121	2400007, 2400008	2400035, 2400036	2400067, 2400068	2400095, 2400096	BS EN 197-1:2000/2011 Strength Class 52.5N  Specification
Date of Sample Received	10/7/2023	11/9/2023	3/11/2023	3/1/2024	1/3/2024	7/5/2024	28/6/2024	
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> )	3110	3090	3080	3100	3110	3110	3100	Not specified
Fineness : Specific surface (cm <sup>2</sup> /g)	3280	3520	3840	3780	3660	3800	3800	Not specified
Consistence : Standard consistence (%)	28.0	28.0	28.0	27.0	28.0	27.5	27.0	Not specified
Setting Time : Initial setting time (min)	115	125	130	130	140	115	110	Min.45 min
	Final setting time (min)	165	165	165	165	165	150	Not specified
Soundness (Le Chatelier) : Expansion (mm)	0.0	0.5	0.0	0.5	1.0	0.0	0.0	Max.10 mm
<b>Compressive Strength ( broken mortar prism ) :</b>								
Average 2 days strength (MPa)	20.8	26.8	21.8	22.8	24.7	22.4	21.3	Min. 20 MPa
Average 28 days strength (MPa)	61.5	57.4	60.8	62.5	60.7	59.9	55.9	Min. 52.5 MPa
<b>Flexural Strength ( mortar prism ) :</b>								
Average 2 days strength (MPa)	4.2	4.9	4.4	4.8	4.4	4.5	4.2	Not specified
Average 28 days strength (MPa)	7.6	9.1	8.4	8.2	7.8	8.3	8.3	Not specified
<b>Chemical Composition</b>								
Observed Mass Loss-on-ignition (%)	2.5	2.7	3.2	2.8	2.9	2.7	2.8	Max. 5.0%
Insoluble Residue (%)	<0.5	1.2	1.8	1.2	0.7	1.3	1.3	Max. 5.0%
Sulphate Content, expressed as SO <sub>3</sub> (%)	1.9	2.7	2.2	2.3	2.3	2.4	3.2	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 (%)	0.70	0.66	0.63	0.65	0.72	0.56	0.56	---
Na <sub>2</sub> O (%)	<0.1	<0.1	<0.1	0.11	0.1	0.14	<0.1	---
Total Alkali ( Na <sub>2</sub> O Eq.) (%)	0.52	0.44	0.51	0.54	0.58	0.51	0.45	---

**5 Onoda / Chichibu Onoda Cement Corporation**  
**(Portland Cement, Strength Class 52.5N)**

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Laboratory Reference	2300064	2300094	2300122	2400009, 2400010	2400037, 2400038	2400069, 2400070	2400097, 2400098	BS EN 197-1:2000/2011 Strength Class 52.5N Specification
Date of Sample Received	10/7/2023	11/9/2023	3/11/2023	3/1/2024	1/3/2024	7/5/2024	28/6/2024	
Country of Origin Stated By Client	Japan	Japan	Japan	Japan	Japan	Japan	Japan	
<b>Physical Properties</b>								
Density (kg/m <sup>3</sup> )	3160	3150	3150	3150	3150	3140	3120	Not specified
Fineness : Specific surface (cm <sup>2</sup> /g)	3230	3260	3570	3550	3350	3570	3560	Not specified
Consistence : Standard consistence (%)	26.5	27.0	27.0	26.5	26.0	27.0	26.5	Not specified
Setting Time : Initial setting time (min)	120	145	165	160	155	150	160	Min.45 min
	Final setting time (min)	180	225	225	210	210	210	Not specified
Soundness (Le Chatelier) : Expansion (mm)	0.0	0.5	0.5	0.0	0.5	0.5	0.0	Max.10 mm
<b>Compressive Strength ( broken mortar prism ) :</b>								
Average 2 days strength (MPa)	22.2	25.3	26.0	25.6	22.7	29.7	25.7	Min. 20 MPa
Average 28 days strength (MPa)	62.2	61.5	61.9	60.8	60.9	66.7	62.5	Min. 52.5 MPa
<b>Flexural Strength ( mortar prism ) :</b>								
Average 2 days strength (MPa)	4.5	4.8	5.5	4.8	4.3	5.5	4.8	Not specified
Average 28 days strength (MPa)	8.3	8.3	9.0	8.7	8.9	8.4	8.8	Not specified
<b>Chemical Composition</b>								
Observed Mass Loss-on-ignition (%)	2.4	2.6	3.0	3.0	2.9	2.9	2.6	Max. 5.0%
Insoluble Residue (%)	<0.5	0.9	0.7	<0.5	<0.5	<0.5	0.7	Max. 5.0%
Sulphate Content, expressed as SO <sub>3</sub> (%)	1.5	1.9	2.0	2.0	1.9	2.2	2.3	Max. 4.0%
Chloride Content (%)	0.03	0.03	0.02	0.03	0.02	0.04	0.02	Max. 0.10%
K <sub>2</sub> O (%)	0.44	0.38	0.41	0.41	0.41	0.52	0.44	---
Na <sub>2</sub> O (%)	0.21	0.20	0.25	0.29	0.24	0.10	0.26	---
Total Alkali ( Na <sub>2</sub> O Eq.) (%)	0.49	0.45	0.52	0.56	0.51	0.44	0.55	---

**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	2300066	2300096	2300123	2400011, 2400012	2400039, 2400040	2400071, 2400072	2400099, 2400100	BS EN 197-1:2000/2011 Strength Class 52.5N  Specification
Date of Sample Received	10/7/2023	11/9/2023	3/11/2023	3/1/2024	1/3/2024	7/5/2024	28/6/2024	
Country of Origin Stated By Client	China	China	China	China	China	China	China	
<b>Physical Properties</b>								
Density (kg/m <sup>3</sup> )	3150	3150	3150	3160	3160	3170	3130	Not specified
Fineness : Specific surface (cm <sup>2</sup> /g)	3770	3550	3880	3870	3990	3920	3940	Not specified
Consistence : Standard consistence (%)	26.0	25.5	26.0	26.5	26.0	27.0	26.5	Not specified
Setting Time : Initial setting time (min)	115	140	130	140	170	150	140	Min.45 min
	Final setting time (min)	165	180	165	180	210	195	195
Soundness (Le Chatelier) : Expansion (mm)	0.5	0.0	0.5	0.5	1.0	0.5	0.5	Max.10 mm
<b>Compressive Strength ( broken mortar prism ) :</b>								
Average 2 days strength (MPa)	30.9	31.9	29.5	35.2	30.7	31.6	26.8	Min. 20 MPa
Average 28 days strength (MPa)	55.9	59.5	58.9	61.3	58.2	58.8	60.2	Min. 52.5 MPa
<b>Flexural Strength ( mortar prism ) :</b>								
Average 2 days strength (MPa)	5.7	5.6	5.4	6.1	5.1	5.5	5.3	Not specified
Average 28 days strength (MPa)	8.6	8.3	8.3	8.4	8.2	8.2	8.4	Not specified
<b>Chemical Composition</b>								
Observed Mass Loss-on-ignition (%)	1.7	1.9	2.1	2.0	1.9	1.8	1.2	Max. 5.0%
Insoluble Residue (%)	<0.5	1.6	0.9	0.6	<0.5	<0.5	0.6	Max. 5.0%
Sulphate Content, expressed as SO <sub>3</sub> (%)	2.1	2.6	2.8	2.9	2.4	2.9	2.5	Max. 4.0%
Chloride Content (%)	0.04	0.01	0.02	0.02	0.04	0.03	0.02	Max. 0.10%
K <sub>2</sub> O (%)	0.60	0.59	0.60	0.67	0.64	0.70	0.70	---
Na <sub>2</sub> O (%)	<0.1	<0.1	<0.1	0.12	<0.1	<0.1	<0.1	---
Total Alkali ( Na <sub>2</sub> O Eq.) (%)	0.47	0.42	0.46	0.56	0.48	0.50	0.51	---

Laboratory Reference	2300067	2300097	2300124	2400013, 2400014	2400041, 2400042	2400073, 2400074	2400101, 2400102	BS EN 197-1:2000/2011 Strength Class 52.5N Specification
Date of Sample Received	10/7/2023	11/9/2023	3/11/2023	3/1/2024	1/3/2024	7/5/2024	28/6/2024	
Country of Origin Stated By Client	China	China	China	China	China	China	China	
<b>Physical Properties</b>								
Density (kg/m <sup>3</sup> )	3160	3140	3150	3130	3140	3150	3130	Not specified
Fineness : Specific surface (cm <sup>2</sup> /g)	3670	3730	4180	4220	4230	4160	4190	Not specified
Consistence : Standard consistence (%)	26.0	28.0	27.0	26.0	27.0	27.0	27.0	Not specified
Setting Time : Initial setting time (min)	115	160	145	150	150	135	155	Min.45 min
	Final setting time (min)	150	225	195	195	225	180	210
Soundness (Le Chatelier) : Expansion (mm)	0.0	0.0	1.0	1.0	1.0	0.0	0.5	Max.10 mm
<b>Compressive Strength ( broken mortar prism ) :</b>								
Average 2 days strength (MPa)	26.7	25.5	26.6	25.9	26.6	28.2	24.5	Min. 20 MPa
Average 28 days strength (MPa)	57.7	57.7	65.6	64.7	65.4	66.1	63.6	Min. 52.5 MPa
<b>Flexural Strength ( mortar prism ) :</b>								
Average 2 days strength (MPa)	4.7	4.1	4.8	4.4	4.9	5.0	5.0	Not specified
Average 28 days strength (MPa)	8.2	8.6	8.7	8.5	8.8	8.4	8.2	Not specified
<b>Chemical Composition</b>								
Observed Mass Loss-on-ignition (%)	1.3	2.2	1.6	2.8	1.9	2.0	1.9	Max. 5.0%
Insoluble Residue (%)	<0.5	1.5	0.6	0.9	<0.5	<0.5	0.9	Max. 5.0%
Sulphate Content, expressed as SO <sub>3</sub> (%)	2.7	2.6	2.4	2.3	2.3	2.2	2.5	Max. 4.0%
Chloride Content (%)	0.03	0.04	0.02	0.03	0.04	0.05	0.04	Max. 0.10%
K <sub>2</sub> O (%)	0.33	0.40	0.29	0.36	0.31	0.41	0.36	---
Na <sub>2</sub> O (%)	<0.1	<0.1	<0.1	0.15	<0.1	0.12	0.12	---
Total Alkali ( Na <sub>2</sub> O Eq.) (%)	0.31	0.32	0.28	0.38	0.29	0.39	0.36	---



Laboratory Reference	2300071	2300098	2300125	2400015, 2400016	2400043, 2400044	2400075, 2400076	2400103, 2400104	BS3892:Part 1: 1997  Specification
Date of Sample Received	10/7/2023	11/9/2023	3/11/2023	3/1/2024	1/3/2024	7/5/2024	28/6/2024	
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 (%)	9.4	9.9	9.7	9.5	9.4	7.1	8.8	Not more than 12%
Particle Density (kg/m <sup>3</sup> )	2550	2670	2400	2650	2590	2610	2500	Not less than 2000 kg/m <sup>3</sup>
Water Requirement (%)	90	90	90	90	90	90	90	^Note (1)
Strength Factor ---	1.03	0.86	0.82	0.92	0.90	0.90	0.91	^Note (1)
Standard Consistence (%)	24.5	24.0	25.0	24.0	24.5	24.5	25.0	---
Initial Setting Time (min)	145	220	245	250	225	225	215	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	0.5	Not more than 10 mm
<b>Portland Cement used</b>								
Brand	Special Green Island	Champion	Champion	Champion	Champion	Champion	Champion	---
Lab. Reference No.	2300033	2300062	2300062	2300119	2300119	2400031, 2400032	2400031, 2400032	---
Initial Setting Time (min)	130	160	160	170	170	150	150	---
<b>Chemical Composition</b>								
Moisture Content (%)	0.2	<0.1	0.3	0.2	0.1	0.3	0.1	Not more than 0.5%
Loss-on-ignition (%)	0.9	<0.5	1.4	0.6	0.6	0.8	1.1	Not more than 7%
Sulphate Content, expressed as SO <sub>3</sub> (%)	1.3	1.3	1.1	1.2	1.3	1.3	1.5	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 (%)	12.0	16.0	7.3	14.0	14.0	10.8	13.1	Not more than 10.0%
K <sub>2</sub> O (%)	1.2	1.2	1.1	1.2	1.2	1.4	1.2	---
Na <sub>2</sub> O (%)	2.5	1.4	1.9	2.0	1.7	2.0	2.1	---
Total Alkali ( Na <sub>2</sub> O Eq.) (%)	3.3	2.2	2.6	2.8	2.5	3.0	2.8	---

^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	2300072	2300099	2300126	2400017, 2400018	2400045, 2400046	2400077, 2400078	2400105, 2400106	BS3892:Part 1: 1997  Specification
Date of Sample Received	10/7/2023	11/9/2023	3/11/2023	3/1/2024	1/3/2024	7/5/2024	28/6/2024	
Country of Origin Stated By Client	China	China	China	China	China	China	China	
<b>Physical Properties</b>								
Fineness (%)	16.9	5.9	16.8	10.1	4.9	5.3	16.6	Not more than 12% Not less than 2000 kg/m <sup>3</sup> ^Note (1) ^Note (1) --- Not less than the initial setting time of the Portland cement used Not more than 10 mm
Particle Density (kg/m <sup>3</sup> )	2290	2450	2290	2400	2490	2500	2390	
Water Requirement (%)	95	95	93	93	89	89	91	
Strength Factor ---	0.87	0.71	0.73	0.86	0.88	0.83	0.85	
Standard Consistence (%)	26.0	27.0	26.0	26.0	26.0	25.5	26.0	
Initial Setting Time (min)	140	295	240	260	260	285	240	
Soundness (mm)	0.0	0.5	0.0	0.5	0.5	0.5	0.0	
<b>Portland Cement used</b>								
Brand	Special Green Island	Champion	Champion	Champion	Champion	Champion	Champion	---
Lab. Reference No.	2300033	2300062	2300062	2300119	2300119	2400031, 2400032	2400031, 2400032	---
Initial Setting Time (min)	130	160	160	170	170	150	150	---
<b>Chemical Composition</b>								
Moisture Content (%)	0.2	0.1	<0.1	<0.1	<0.1	0.2	<0.1	Not more than 0.5%
Loss-on-ignition (%)	8.9	1.8	8.2	<0.5	0.7	1.1	1.4	Not more than 7%
Sulphate Content, expressed as SO <sub>3</sub> (%)	<0.5	0.5	<0.5	<0.5	0.8	0.5	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 (%)	4.4	9.9	2.4	13.0	9.1	7.1	7.3	Not more than 10.0%
K <sub>2</sub> O (%)	2.9	1.4	3.0	1.4	1.5	1.7	1.5	---
Na <sub>2</sub> O (%)	0.4	0.8	0.5	1.6	1.0	1.1	1.2	---
Total Alkali ( Na <sub>2</sub> O Eq.) (%)	2.3	1.7	2.5	2.5	2.0	2.2	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.

Laboratory Reference	2300073	2300100	2300127	2400019, 2400020	2400047, 2400048	2400079, 2400080	2400107, 2400108	BS3892:Part 1: 1997  Specification
Date of Sample Received	10/7/2023	11/9/2023	3/11/2023	3/1/2024	1/3/2024	7/5/2024	28/6/2024	
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 (%)	10.4	10.3	12.1	9.8	10.6	10.1	8.3	Not more than 12%
Particle Density (kg/m <sup>3</sup> )	2330	2420	2390	2390	2410	2440	2360	Not less than 2000 kg/m <sup>3</sup>
Water Requirement (%)	99	95	95	95	93	96	96	^Note (1)
Strength Factor ---	0.96	0.74	0.77	0.75	0.77	0.75	0.80	^Note (1)
Standard Consistence (%)	28.5	29.0	29.0	28.5	28.5	29.0	29.0	---
Initial Setting Time (min)	140	205	240	250	225	230	190	Not less than the initial setting time of the Portland cement used
Soundness (mm)	0.5	0.5	0.5	1.0	0.0	0.5	0.0	Not more than 10 mm
<b>Portland Cement used</b>								
Brand	Special Green Island	Champion	Champion	Champion	Champion	Champion	Champion	---
Lab. Reference No.	2300033	2300062	2300062	2300119	2300119	2400031, 2400032	2400031, 2400032	---
Initial Setting Time (min)	130	160	160	170	170	150	150	---
<b>Chemical Composition</b>								
Moisture Content (%)	0.4	0.3	0.1	0.1	0.2	0.3	0.2	Not more than 0.5%
Loss-on-ignition (%)	2.7	2.7	2.4	2.0	2.1	2.3	1.8	Not more than 7%
Sulphate Content, expressed as SO <sub>3</sub> (%)	0.5	0.7	0.7	0.6	0.6	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 (%)	4.7	6.8	6.8	5.6	6.6	7.0	5.1	Not more than 10.0%
K <sub>2</sub> O (%)	0.9	1.1	1.0	1.2	1.2	0.9	0.9	---
Na <sub>2</sub> O (%)	0.8	0.8	0.9	1.2	1.1	0.8	0.6	---
Total Alkali ( Na <sub>2</sub> O Eq.) (%)	1.4	1.5	1.5	2.1	1.9	1.4	1.2	---

^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.

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

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Laboratory Reference	2300074	2300101	2300128	2400021, 2400022	2400049, 2400050	2400081, 2400082	2400109, 2400110	BS3892:Part 1: 1997  Specification
Date of Sample Received	10/7/2023	11/9/2023	3/11/2023	3/1/2024	1/3/2024	7/5/2024	28/6/2024	
Country of Origin Stated By Client	China	China	China	China	China	China	China	
<b>Physical Properties</b>								
Fineness (%)	13.1	6.9	14.1	11.2	8.0	8.5	4.6	Not more than 12%
Particle Density (kg/m <sup>3</sup> )	2240	2310	2290	2270	2470	2360	2470	Not less than 2000 kg/m <sup>3</sup>
Water Requirement (%)	94	93	94	93	91	91	91	^Note (1)
Strength Factor ---	0.89	0.77	0.78	0.82	0.86	0.80	0.84	^Note (1)
Standard Consistence (%)	26.5	27.0	28.0	27.0	26.0	26.0	25.5	---
Initial Setting Time (min)	160	230	250	240	255	220	180	Not less than the initial setting time of the Portland cement used
Soundness (mm)	0.0	0.5	0.5	0.5	0.5	0.5	0.0	Not more than 10 mm
<b>Portland Cement used</b>								
Brand	Special Green Island	Champion	Champion	Champion	Champion	Champion	Champion	---
Lab. Reference No.	2300033	2300062	2300062	2300119	2300119	2400031, 2400032	2400031, 2400032	---
Initial Setting Time (min)	130	160	160	170	170	150	150	---
<b>Chemical Composition</b>								
Moisture Content (%)	0.2	0.1	0.1	<0.1	<0.1	0.2	0.1	Not more than 0.5%
Loss-on-ignition (%)	1.0	1.2	1.3	<0.5	<0.5	0.6	1.0	Not more than 7%
Sulphate Content, expressed as SO <sub>3</sub> (%)	0.6	0.6	1.0	<0.5	1.1	0.8	1.0	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 (%)	2.8	6.9	5.8	5.7	10.0	9.9	7.8	Not more than 10.0%
K <sub>2</sub> O (%)	1.8	1.4	1.2	1.5	1.3	1.1	1.5	---
Na <sub>2</sub> O (%)	1.1	1.5	0.8	1.3	0.9	1.6	1.4	---
Total Alkali ( Na <sub>2</sub> O Eq.) (%)	2.3	2.4	1.7	2.3	1.7	2.3	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.

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

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Laboratory Reference	2300010	2300011	2300012	2400001, 2400002	2400003, 2400004	2400007, 2400008	2400009, 2400010	BS EN 15167-1:2006	
Date of Sample Received	10/7/2023	11/9/2023	3/11/2023	3/1/2024	1/3/2024	7/5/2024	28/6/2024		
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 ≤ twice of initial setting time for Portland cement used	
Initial Setting Time (min)	170	155	165	180	165	175	170		
Density (kg/m <sup>3</sup> )	2870	2880	2860	2880	2870	2880	2860		Not specified
Fineness : Specific surface (m <sup>2</sup> /kg)	415	408	478	472	487	491	486		≥ 275 m <sup>2</sup> /kg
Activity Index :									
7 days (%)	55	51	50	60	63	55	54	≥ 45 %	
28 days (%)	88	87	86	83	91	90	87	≥ 70 %	
<b>Portland Cement used</b>									
Brand	Champion	Special Green Island	Special Green Island	Special Green Island	Special Green Island	Special Green Island	Special Green Island	---	
Lab. Reference No.	2300028	2300065	2300065	2300121	2300121	2400035, 2400036	2400035, 2400036	---	
Initial Setting Time (min)	180	115	115	130	130	140	140	---	
<b>Chemical Composition</b>									
Loss-on-ignition (%)	1.5	1.2	1.5	1.2	1.3	1.5	<0.5	≤ 3.0%	
Sulphate Content, expressed as SO <sub>3</sub> (%)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	≤ 2.5%	
Chloride Content (%)	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	≤ 0.10%	
Magnesium Oxide Content (%)	6.2	6.1	5.6	5.8	5.6	5.9	5.2	≤ 18%	
Moisture Content (%)	0.2	<0.2	0.2	<0.2	0.2	0.3	<0.2	≤ 1.0%	
Sulphide Content (%)	0.7	0.8	<0.7	0.8	0.9	0.7	0.9	≤ 2.0%	