Cement Circular

Issue No. : 4/2020

Date : 07-Sep-20

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Test results for the following cementitious materials

* 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. W.C.Leung, 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 **Issue No. : 4/2020**

(Portland Cement, Strength Class 52.5N)

Laboratory Reference		1900042	1900071	1900096	2000001	2000026	2000058	2000088	BS EN 197-1:2000
Date of Sample Received		26/06/2019	20/08/2019	22/10/2019	19/12/2019	12/03/2020	07/05/2020	03/07/2020	Strength Class 52.5N
Country of Origin Stated By Client		Japan	Japan	Japan	Japan	Japan	Japan	Japan	Specification
Physical Properties									
Density	(kg/m^3)	3130	3110	3100	3110	3130	3130	3180	Not specified
Fineness : Specific surface	(cm^2/g)	3520	3530	3550	3610	3430	3490	3570	Not specified
Consistence : Standard consistence	(%)	28.0	27.5	27.5	27.5	27.0	27.5	27.0	Not specified
Setting Time : Initial setting time	(min)	170	140	155	135	125	130	120	Min.45 min
Final setting time	(min)	210	180	195	180	150	165	165	Not specified
Soundness (Le Chatelier) : Expansion	(mm)	0.5	0.5	0.0	1.0	0.5	0.0	0.5	Max.10 mm
Compressive Strength (broken mortar prism) :									
Average 2 days strength	(MPa)	25.0	26.9	29.7	27.8	27.3	27.4	24.3	Min. 20 MPa
Average 28 days strength	(MPa)	66.6	65.4	64.8	66.2	67.9	66.4	67.8	Min. 52.5 MPa
Flexural Strength (mortar prism) :									
Average 2 days strength	(MPa)	5.1	5.3	5.4	5.5	5.0	5.1	4.8	Not specified
Average 28 days strength	(MPa)	9.0	8.9	9.1	8.9	8.6	9.3	8.2	Not specified
Chemical Composition									
Observed Mass Loss-on-ignition	(%)	1.9	1.8	1.9	2.0	1.7	2.0	1.9	Max. 5.0%
Insoluble Residue	(%)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	Max. 5.0%
Sulphate Content, expressed as SO_3	(%)	1.9	2.0	2.0	2.1	2.0	2.0	1.9	Max. 4.0%
Chloride Content	(%)	0.02	0.02	0.02	0.03	0.02	0.02	0.02	Max. 0.10%
K_2O	(%)	0.36	0.42	0.35	0.33	0.39	0.40	0.36	---
Na_2O	(%)	0.28	0.24	0.25	0.24	0.23	0.24	0.24	---
Total Alkali (Na_2O Eq.)	(%)	0.52	0.51	0.48	0.46	0.49	0.50	0.47	---

Laboratory Reference		1900043	1900072	1900097	2000002	2000027	2000059	2000089	BS EN 197-1:2000 Strength Class 52.5N
Date of Sample Received		26/06/2019	20/08/2019	22/10/2019	19/12/2019	12/03/2020	07/05/2020	03/07/2020	
Country of Origin Stated By Client		Taiwan, China	Taiwan, China	Taiwan, China	Taiwan, China	Taiwan, China	Taiwan, China	Taiwan, China	Specification
Physical Properties									
Density	(kg/m^3)	3140	3120	3110	3120	3140	3140	3150	Not specified
Fineness : Specific surface	(cm^2/g)	3780	3690	3710	3800	3880	3650	3810	Not specified
Consistence : Standard consistence	(%)	28.0	29.0	28.0	30.0	28.5	27.5	28.0	Not specified
Setting Time : Initial setting time	(min)	175	160	165	170	140	140	120	Min.45 min
Final setting time	(min)	210	195	210	210	180	180	165	Not specified
Soundness (Le Chatelier) : Expansion	(mm)	1.0	0.5	0.5	1.0	1.0	0.5	0.5	Max.10 mm
Compressive Strength (broken mortar prism) :									
Average 2 days strength	(MPa)	30.7	26.9	30.2	26.1	29.5	27.4	25.1	Min. 20 MPa
Average 28 days strength	(MPa)	61.6	58.5	57.9	59.7	61.4	62.4	56.6	Min. 52.5 MPa
Flexural Strength (mortar prism) :									
Average 2 days strength	(MPa)	5.1	5.1	5.4	5.0	5.1	4.7	4.5	Not specified
Average 28 days strength	(MPa)	9.0	8.5	8.5	9.0	8.5	8.1	7.3	Not specified
Chemical Composition									
Observed Mass Loss-on-ignition	(%)	1.1	0.9	1.0	1.0	1.0	1.1	1.8	Max. 5.0%
Insoluble Residue	(%)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	Max. 5.0%
Sulphate Content, expressed as SO_3	(%)	<0.5	2.7	2.7	2.7	2.6	2.6	2.6	Max. 4.0%
Chloride Content	(%)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	Max. 0.10%
K_2O	(%)	0.50	0.48	0.50	0.50	0.52	0.56	0.47	---
Na_2O	(%)	0.42	0.32	0.33	0.28	0.30	0.35	0.26	---
Total Alkali (Na_2O Eq.)	(%)	0.75	0.64	0.66	0.61	0.64	0.72	0.57	---

Laboratory Reference		1900044	1900073	1900098	2000003	2000028	2000060	2000090	BS EN 197-1:2000 Strength Class 52.5N
Date of Sample Received		27/06/2019	27/08/2019	23/10/2019	20/12/2019	13/03/2020	08/05/2020	07/07/2020	
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
Physical Properties									
Density	(kg/m^3)	3090	3030	3030	3080	3100	3090	3130	Not specified
Fineness : Specific surface	(cm^2/g)	3670	3620	3560	3560	3640	3560	3510	Not specified
Consistence : Standard consistence	(%)	28.0	28.0	28.0	27.0	28.0	28.0	28.0	Not specified
Setting Time : Initial setting time	(min)	110	110	120	125	110	95	110	Min.45 min
Final setting time	(min)	150	150	150	165	150	135	150	Not specified
Soundness (Le Chatelier) : Expansion	(mm)	0.5	0.5	1.0	0.5	1.0	0.0	1.0	Max.10 mm
Compressive Strength (broken mortar prism) :									
Average 2 days strength	(MPa)	24.9	26.2	26.4	26.4	27.1	25.7	24.0	Min. 20 MPa
Average 28 days strength	(MPa)	63.9	63.3	64.3	65.1	63.0	64.2	68.2	Min. 52.5 MPa
Flexural Strength (mortar prism) :									
Average 2 days strength	(MPa)	4.6	4.9	4.7	5.2	4.9	4.8	4.8	Not specified
Average 28 days strength	(MPa)	8.9	8.8	8.4	9.4	9.2	8.9	8.7	Not specified
Chemical Composition									
Observed Mass Loss-on-ignition	(%)	1.7	1.9	1.7	2.8	2.6	2.9	2.3	Max. 5.0%
Insoluble Residue	(%)	4.3	2.0	2.1	<0.5	0.7	1.0	0.6	Max. 5.0%
Sulphate Content, expressed as SO_3	(%)	3.0	3.3	3.3	2.3	2.8	2.5	2.2	Max. 4.0%
Chloride Content	(%)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	Max. 0.10%
K_2O	(%)	0.53	0.51	0.49	0.55	0.47	0.47	0.50	---
Na_2O	(%)	0.17	0.21	0.23	0.18	0.16	0.13	<0.1	---
Total Alkali (Na_2O Eq.)	(%)	0.52	0.55	0.55	0.55	0.47	0.44	0.40	---

Laboratory Reference		1900045	1900074	1900099	2000004	2000029	2000061	2000091	BS EN 197-1:2000
Date of Sample Received		26/06/2019	20/08/2019	22/10/2019	19/12/2019	12/03/2020	07/05/2020	03/07/2020	Strength Class 52.5N
Country of Origin Stated By Client		China	China	China	China	China	China	China	Specification
Physical Properties									
Density	(kg/m^3)	3110	3120	3110	3110	3130	3110	3150	Not specified
Fineness : Specific surface	(cm^2/g)	3690	3820	3980	3870	3820	3830	3890	Not specified
Consistence : Standard consistence	(%)	28.5	28.5	28.0	28.0	27.5	27.5	28.5	Not specified
Setting Time : Initial setting time	(min)	85	110	145	135	115	120	100	Min.45 min
Final setting time	(min)	135	150	180	165	150	165	150	Not specified
Soundness (Le Chatelier) : Expansion	(mm)	0.5	0.5	0.5	0.5	1.0	0.0	0.5	Max.10 mm
Compressive Strength (broken mortar prism) :									
Average 2 days strength	(MPa)	29.1	24.2	30.4	24.6	26.5	26.5	25.5	Min. 20 MPa
Average 28 days strength	(MPa)	64.5	65.5	62.0	66.4	60.9	64.2	68.8	Min. 52.5 MPa
Flexural Strength (mortar prism) :									
Average 2 days strength	(MPa)	5.4	5.1	5.1	5.0	5.2	5.0	4.6	Not specified
Average 28 days strength	(MPa)	8.3	7.9	8.7	8.8	7.1	8.1	7.6	Not specified
Chemical Composition									
Observed Mass Loss-on-ignition	(%)	1.3	1.6	1.3	1.6	1.7	1.7	1.7	Max. 5.0%
Insoluble Residue	(%)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.8	Max. 5.0%
Sulphate Content, expressed as SO_3	(%)	2.0	1.5	2.4	1.5	1.5	1.7	1.4	Max. 4.0%
Chloride Content	(%)	0.03	0.02	0.02	0.02	0.02	0.02	0.02	Max. 0.10%
K_2O	(%)	0.38	0.56	0.55	0.54	0.52	0.55	0.36	---
Na_2O	(%)	0.17	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	---
Total Alkali (Na_2O Eq.)	(%)	0.42	0.45	0.42	0.43	0.43	0.45	0.30	---

Laboratory Reference		1900046	1900075	1900100	2000005	2000030	2000062	2000092	BS EN 197-1:2000 Strength Class 52.5N
Date of Sample Received		27/06/2019	27/08/2019	23/10/2019	20/12/2019	13/03/2020	08/05/2020	07/07/2020	
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
Physical Properties									
Density	(kg/m^3)	3090	3050	3020	3080	3090	3100	3110	Not specified
Fineness : Specific surface	(cm^2/g)	3820	3630	3520	3550	3560	3820	3680	Not specified
Consistence : Standard consistence	(%)	28.0	27.5	28.0	27.5	28.0	28.0	27.5	Not specified
Setting Time : Initial setting time	(min)	125	125	120	125	125	115	100	Min.45 min
Final setting time	(min)	150	165	165	165	165	150	135	Not specified
Soundness (Le Chatelier) : Expansion	(mm)	0.5	0.0	0.5	0.5	0.5	0.0	0.5	Max.10 mm
Compressive Strength (broken mortar prism) :									
Average 2 days strength	(MPa)	24.5	25.3	25.9	26.0	27.3	27.6	23.7	Min. 20 MPa
Average 28 days strength	(MPa)	62.1	62.1	64.5	62.7	60.9	64.3	65.5	Min. 52.5 MPa
Flexural Strength (mortar prism) :									
Average 2 days strength	(MPa)	4.6	4.4	4.6	5.0	4.7	4.8	4.5	Not specified
Average 28 days strength	(MPa)	9.0	8.1	8.9	9.6	8.3	9.2	8.2	Not specified
Chemical Composition									
Observed Mass Loss-on-ignition	(%)	1.7	1.7	1.8	2.7	2.7	3.0	2.2	Max. 5.0%
Insoluble Residue	(%)	4.2	1.8	2.0	<0.5	<0.5	0.7	0.7	Max. 5.0%
Sulphate Content, expressed as SO_3	(%)	3.1	3.3	3.3	2.3	2.4	2.5	2.3	Max. 4.0%
Chloride Content	(%)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	Max. 0.10%
K_2O	(%)	0.54	0.51	0.50	0.55	0.52	0.45	0.50	---
Na_2O	(%)	0.18	0.21	0.22	0.18	0.18	0.10	<0.1	---
Total Alkali (Na_2O Eq.)	(%)	0.54	0.55	0.55	0.54	0.52	0.40	0.40	---

Laboratory Reference		1900047	1900076	1900101	2000006	2000031	2000063	2000093	BS EN 197-1:2000
Date of Sample Received		25/06/2019	19/08/2019	21/10/2019	20/12/2019	11/03/2020	08/05/2020	02/07/2020	Strength Class 52.5N
Country of Origin Stated By Client		Japan	Japan	Japan	Japan	Japan	Japan	Japan	Specification
Physical Properties									
Density	(kg/m^3)	3120	3120	3080	3110	3140	3130	3120	Not specified
Fineness : Specific surface	(cm^2/g)	3330	3450	3430	3360	3240	3250	3480	Not specified
Consistence : Standard consistence	(%)	27.5	28.0	28.0	26.0	26.5	26.0	27.0	Not specified
Setting Time : Initial setting time	(min)	160	150	155	155	160	165	120	Min.45 min
Final setting time	(min)	195	180	195	195	195	210	165	Not specified
Soundness (Le Chatelier) : Expansion	(mm)	0.5	0.5	1.0	0.5	0.5	0.5	0.5	Max.10 mm
Compressive Strength (broken mortar prism) :									
Average 2 days strength	(MPa)	26.3	26.9	28.9	23.1	22.8	27.8	24.7	Min. 20 MPa
Average 28 days strength	(MPa)	63.2	62.4	65.1	60.3	61.3	64.7	64.4	Min. 52.5 MPa
Flexural Strength (mortar prism) :									
Average 2 days strength	(MPa)	5.5	5.5	5.4	5.1	4.4	4.9	4.9	Not specified
Average 28 days strength	(MPa)	8.7	8.5	8.6	9.2	9.2	9.4	9.7	Not specified
Chemical Composition									
Observed Mass Loss-on-ignition	(%)	2.2	1.8	1.7	2.7	2.7	2.4	2.4	Max. 5.0%
Insoluble Residue	(%)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	Max. 5.0%
Sulphate Content, expressed as SO_3	(%)	2.1	2.0	2.0	1.9	1.9	1.9	1.8	Max. 4.0%
Chloride Content	(%)	0.02	0.02	0.02	0.01	0.01	0.02	0.02	Max. 0.10%
K_2O	(%)	0.39	0.42	0.40	0.39	0.38	0.37	0.42	---
Na_2O	(%)	0.26	0.25	0.20	0.25	0.26	0.25	0.25	---
Total Alkali (Na_2O Eq.)	(%)	0.52	0.53	0.46	0.51	0.51	0.50	0.52	---

Laboratory Reference		1900048	1900077	1900102	2000007	2000032	2000064	2000094	BS EN 197-1:2000
Date of Sample Received		25/06/2019	19/08/2019	21/10/2019	18/12/2019	11/03/2020	06/05/2020	02/07/2020	Strength Class 52.5N
Country of Origin Stated By Client		Taiwan, China	Taiwan, China	Taiwan, China	Taiwan, China	Taiwan, China	Taiwan, China	Taiwan, China	Specification
Physical Properties									
Density	(kg/m^3)	3120	3150	3100	3130	3150	3150	3130	Not specified
Fineness : Specific surface	(cm^2/g)	3860	3840	3830	3780	3960	3910	3950	Not specified
Consistence : Standard consistence	(%)	27.5	27.5	27.5	28.0	28.0	28.0	28.0	Not specified
Setting Time : Initial setting time	(min)	160	130	155	140	140	160	145	Min.45 min
Final setting time	(min)	195	165	180	180	180	195	180	Not specified
Soundness (Le Chatelier) : Expansion	(mm)	1.0	0.5	0.5	0.5	1.0	0.5	0.5	Max.10 mm
Compressive Strength (broken mortar prism) :									
Average 2 days strength	(MPa)	24.8	25.9	25.0	27.5	28.1	26.9	27.4	Min. 20 MPa
Average 28 days strength	(MPa)	56.9	64.4	62.0	62.4	64.0	63.0	64.8	Min. 52.5 MPa
Flexural Strength (mortar prism) :									
Average 2 days strength	(MPa)	4.8	4.7	4.7	5.2	4.8	4.5	4.9	Not specified
Average 28 days strength	(MPa)	8.3	9.0	8.2	9.4	8.5	7.7	8.8	Not specified
Chemical Composition									
Observed Mass Loss-on-ignition	(%)	2.1	1.8	1.7	1.8	1.8	2.0	1.8	Max. 5.0%
Insoluble Residue	(%)	<0.5	<0.5	<0.5	<0.5	0.5	<0.5	0.6	Max. 5.0%
Sulphate Content, expressed as SO_3	(%)	2.6	1.3	2.6	2.5	2.6	2.5	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_2O	(%)	0.39	0.39	0.39	0.38	0.36	0.43	0.44	---
Na_2O	(%)	0.31	0.33	0.30	0.30	0.31	0.26	0.27	---
Total Alkali (Na_2O Eq.)	(%)	0.57	0.58	0.56	0.55	0.55	0.54	0.56	---

Laboratory Reference		1900049	1900078	1900103	2000008	2000033	2000065	2000095	BS EN 197-1:2000 Strength Class 52.5N
Date of Sample Received		27/06/2019	27/08/2019	23/10/2019	20/12/2019	13/03/2020	08/05/2020	07/07/2020	
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
Physical Properties									
Density	(kg/m^3)	3090	3040	3030	3090	3100	3090	3080	Not specified
Fineness : Specific surface	(cm^2/g)	3790	3680	3610	3570	3630	3570	3540	Not specified
Consistence : Standard consistence	(%)	28.0	27.5	28.0	27.0	28.0	28.0	28.0	Not specified
Setting Time : Initial setting time	(min)	120	135	110	115	120	115	100	Min.45 min
Final setting time	(min)	150	165	150	165	150	150	135	Not specified
Soundness (Le Chatelier) : Expansion	(mm)	1.0	0.5	0.5	0.5	0.5	0.5	1.0	Max.10 mm
Compressive Strength (broken mortar prism) :									
Average 2 days strength	(MPa)	24.8	26.1	24.5	25.6	26.5	24.8	24.9	Min. 20 MPa
Average 28 days strength	(MPa)	61.6	62.7	62.1	60.8	65.5	64.9	67.6	Min. 52.5 MPa
Flexural Strength (mortar prism) :									
Average 2 days strength	(MPa)	4.4	4.6	4.5	4.8	4.7	4.4	4.8	Not specified
Average 28 days strength	(MPa)	8.5	8.9	8.3	9.3	9.0	8.4	8.8	Not specified
Chemical Composition									
Observed Mass Loss-on-ignition	(%)	1.8	1.7	1.7	2.7	2.5	2.9	2.1	Max. 5.0%
Insoluble Residue	(%)	4.3	1.9	2.0	<0.5	0.7	1.0	0.5	Max. 5.0%
Sulphate Content, expressed as SO_3	(%)	3.4	3.3	3.3	2.0	2.7	2.4	2.3	Max. 4.0%
Chloride Content	(%)	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	Max. 0.10%
K_2O	(%)	0.51	0.52	0.50	0.54	0.47	0.45	0.50	---
Na_2O	(%)	0.18	0.21	0.23	0.18	0.16	0.10	<0.1	---
Total Alkali (Na_2O Eq.)	(%)	0.52	0.55	0.55	0.54	0.47	0.40	0.39	---

Laboratory Reference	1900050	1900079	1900104	2000009	2000034	2000066	2000096	BS EN 197-1:2000
Date of Sample Received	26/06/2019	20/08/2019	22/10/2019	19/12/2019	12/03/2020	07/05/2020	03/07/2020	Strength Class 52.5N
Country of Origin Stated By Client	China	China	China	China	China	China	China	Specification
Physical Properties								
Density (kg/m^3)	3120	3110	3090	3130	3140	3150	3150	Not specified
Fineness : Specific surface (cm^2/g)	4040	3990	3870	3810	4060	4060	4180	Not specified
Consistence : Standard consistence (%)	26.0	30.0	28.0	26.5	27.5	27.0	26.5	Not specified
Setting Time : Initial setting time (min)	90	165	135	130	140	115	110	Min.45 min
Final setting time (min)	120	210	165	165	180	150	150	Not specified
Soundness (Le Chatelier) : Expansion (mm)	0.5	0.5	0.5	0.5	1.0	0.0	0.5	Max.10 mm
Compressive Strength (broken mortar prism) :								
Average 2 days strength (MPa)	28.8	30.9	35.8	34.3	31.7	32.3	32.9	Min. 20 MPa
Average 28 days strength (MPa)	60.2	61.0	63.4	68.3	61.6	61.5	63.6	Min. 52.5 MPa
Flexural Strength (mortar prism) :								
Average 2 days strength (MPa)	5.2	5.8	6.2	6.1	5.8	5.2	5.3	Not specified
Average 28 days strength (MPa)	8.6	8.7	8.8	9.5	8.8	8.7	8.9	Not specified
Chemical Composition								
Observed Mass Loss-on-ignition (%)	1.9	3.1	1.1	1.6	1.7	1.7	1.5	Max. 5.0%
Insoluble Residue (%)	<0.5	2.1	<0.5	<0.5	0.6	0.5	<0.5	Max. 5.0%
Sulphate Content, expressed as SO_3 (%)	2.9	2.7	3.1	2.9	3.0	2.9	2.7	Max. 4.0%
Chloride Content (%)	0.02	0.02	0.03	0.04	0.03	0.03	0.02	Max. 0.10%
K_2O (%)	0.56	0.60	0.68	0.63	0.64	0.63	0.64	---
Na_2O (%)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	---
Total Alkali (Na_2O Eq.) (%)	0.44	0.47	0.51	0.48	0.50	0.49	0.48	---

Laboratory Reference		1900051	1900080	1900105	2000010	2000035	2000067	2000097	BS EN 197-1:2000
Date of Sample Received		26/06/2019	20/08/2019	22/10/2019	19/12/2019	12/03/2020	07/05/2020	03/07/2020	Strength Class 52.5N
Country of Origin Stated By Client		China	China	China	China	China	China	China	Specification
Physical Properties									
Density	(kg/m^3)	3120	3130	3070	3140	3140	3140	3140	Not specified
Fineness : Specific surface	(cm^2/g)	4130	4120	4020	4230	4030	4260	4150	Not specified
Consistence : Standard consistence	(%)	27.5	27.5	28.0	27.0	28.5	27.0	27.5	Not specified
Setting Time : Initial setting time	(min)	145	145	130	120	140	130	130	Min.45 min
Final setting time	(min)	180	180	165	150	180	165	180	Not specified
Soundness (Le Chatelier) : Expansion	(mm)	0.5	0.5	0.5	0.5	1.0	0.0	0.5	Max.10 mm
Compressive Strength (broken mortar prism) :									
Average 2 days strength	(MPa)	30.7	29.6	24.4	27.8	34.2	35.4	29.4	Min. 20 MPa
Average 28 days strength	(MPa)	61.4	58.3	64.2	65.2	65.1	65.7	61.0	Min. 52.5 MPa
Flexural Strength (mortar prism) :									
Average 2 days strength	(MPa)	5.3	5.0	4.9	5.4	5.4	5.3	4.5	Not specified
Average 28 days strength	(MPa)	8.5	7.8	7.2	8.9	8.3	8.4	8.5	Not specified
Chemical Composition									
Observed Mass Loss-on-ignition	(%)	1.3	1.6	1.4	1.3	1.4	1.3	1.5	Max. 5.0%
Insoluble Residue	(%)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	Max. 5.0%
Sulphate Content, expressed as SO_3	(%)	2.3	2.4	1.4	2.1	2.5	2.5	2.4	Max. 4.0%
Chloride Content	(%)	0.02	0.01	0.02	0.02	0.03	0.03	0.03	Max. 0.10%
K_2O	(%)	0.62	0.63	0.57	0.60	0.57	0.53	0.66	---
Na_2O	(%)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	---
Total Alkali (Na_2O Eq.)	(%)	0.46	0.48	0.45	0.44	0.43	0.40	0.49	---

Laboratory Reference		1900052	1900081	1900106	2000011	2000036	2000068	2000098	BS EN 197-1:2000
Date of Sample Received		25/06/2019	20/08/2019	23/10/2019	19/12/2019	11/03/2020	12/05/2020	02/07/2020	Strength Class 52.5N
Country of Origin Stated By Client		Macau SAR, China	Macau SAR, China	Macau SAR, China	Macau SAR, China	Macau SAR, China	Macau SAR, China	Macau SAR, China	Specification
Physical Properties									
Density	(kg/m^3)	3130	3120	3080	3140	3140	3150	3150	Not specified
Fineness : Specific surface	(cm^2/g)	3460	3410	3450	3480	3290	3530	3490	Not specified
Consistence : Standard consistence	(%)	27.5	28.0	27.5	27.0	27.0	27.0	27.0	Not specified
Setting Time : Initial setting time	(min)	170	145	160	155	150	130	130	Min.45 min
Final setting time	(min)	210	180	195	195	195	180	180	Not specified
Soundness (Le Chatelier) : Expansion	(mm)	0.5	0.5	0.5	1.0	1.0	1.0	0.5	Max.10 mm
Compressive Strength (broken mortar prism) :									
Average 2 days strength	(MPa)	24.1	29.7	26.2	27.3	26.6	25.5	24.9	Min. 20 MPa
Average 28 days strength	(MPa)	64.0	66.1	64.6	65.3	64.5	69.0	64.2	Min. 52.5 MPa
Flexural Strength (mortar prism) :									
Average 2 days strength	(MPa)	4.9	5.6	5.2	5.4	4.9	4.7	4.8	Not specified
Average 28 days strength	(MPa)	9.6	8.5	9.1	8.9	9.0	8.7	9.0	Not specified
Chemical Composition									
Observed Mass Loss-on-ignition	(%)	1.8	1.7	1.8	1.9	1.7	1.8	1.9	Max. 5.0%
Insoluble Residue	(%)	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	Max. 5.0%
Sulphate Content, expressed as SO_3	(%)	1.9	2.2	2.1	2.1	2.0	1.9	1.9	Max. 4.0%
Chloride Content	(%)	0.01	0.02	0.03	0.02	0.02	0.03	0.03	Max. 0.10%
K_2O	(%)	0.36	0.43	0.35	0.32	0.38	0.30	0.35	---
Na_2O	(%)	0.30	0.22	0.24	0.25	0.23	0.20	0.23	---
Total Alkali (Na_2O Eq.)	(%)	0.54	0.51	0.47	0.46	0.48	0.40	0.46	---

Laboratory Reference		1900053	1900082	1900107	2000012	2000037	2000070	2000101	BS3892:Part 1: 1997
Date of Sample Received		27/06/2019	27/08/2019	23/10/2019	20/12/2019	13/03/2020	08/05/2020	07/07/2020	
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
Physical Properties									
Fineness	(%)	10.3	4.9	10.2	9.9	7.4	10.2	10.3	Not more than 12%
Particle Density	(kg/m^3)	2400	2520	2480	2480	2650	2490	2480	Not less than 2000 kg/m^3
Water Requirement	(%)	93	95	93	96	92	92	92	See Note
Strength Factor	---	0.83	0.78	0.82	0.75	0.94	0.93	0.93	See Note
Standard Consistentence	(%)	26.0	26.5	25.0	25.0	24.0	25.0	24.5	---
Initial Setting Time	(min)	215	230	170	215	180	165	170	Not less than the initial setting time of the Portland cement used
Soundness	(mm)	1.0	1.0	0.5	0.5	0.5	0.5	0.5	Not more than 10 mm
Portland Cement used									
Brand		Feng Jiang	Feng Jiang	Special Green Island	Special Green Island	Emerald	Emerald	Emerald	
Lab. Reference No.		1800070	1800070	1900049	1900049	2000003	2000003	2000003	
Initial Setting Time		105	105	120	120	125	125	125	
Chemical Composition									
Moisture Content	(%)	0.10	0.20	0.20	0.10	<0.1	0.10	0.2	Not more than 0.5%
Loss-on-ignition	(%)	3.0	1.4	1.6	1.6	1.1	1.5	1.7	Not more than 7%
Sulphate Content, expressed as SO_3	(%)	1.4	1.2	1.1	0.8	0.8	0.7	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	(%)	16.0	8.1	8.6	9.0	13.5	9.1	8.9	Not more than 10.0%
K_2O	(%)	0.90	2.00	1.00	1.00	1.20	1.00	1.0	---
Na_2O	(%)	1.40	1.50	1.70	1.60	1.40	1.70	1.6	---
Total Alkali (Na_2O Eq.)	(%)	2.00	2.80	2.40	2.20	2.20	2.40	2.3	---

Note: 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		1900054	1900083	1900108	2000015	2000038	2000071	2000102	BS3892:Part 1: 1997
Date of Sample Received		27/06/2019	27/08/2019	23/10/2019	31/12/2019	13/03/2020	08/05/2020	07/07/2020	
Country of Origin Stated By Client		China	China	China	China	China	China	China	Specification
Physical Properties									
Fineness	(%)	8.0	10.0	4.3	4.0	4.0	3.0	3.1	Not more than 12%
Particle Density	(kg/m^3)	2400	2470	2510	2540	2460	2620	2610	Not less than 2000 kg/m^3
Water Requirement	(%)	99	96	98	93	90	90	90	See Note
Strength Factor	---	0.74	0.80	0.71	0.83	0.96	1.03	1.00	See Note
Standard Consistentence	(%)	29.5	26.5	26.5	23.5	25.0	24.0	23.5	---
Initial Setting Time	(min)	240	220	200	240	215	240	210	Not less than the initial setting time of the Portland cement used
Soundness	(mm)	0.5	0.5	0.5	1.0	1.0	0.5	0.5	Not more than 10 mm
Portland Cement used									
Brand		Feng Jiang	Feng Jiang	Special Green Island	Special Green Island	Emerald	Emerald	Emerald	
Lab. Reference No.		1800070	1800070	1900049	1900049	2000003	2000003	2000003	
Initial Setting Time		105	105	120	120	125	125	125	
Chemical Composition									
Moisture Content	(%)	0.20	0.20	0.10	<0.1	<0.1	<0.1	<0.1	Not more than 0.5%
Loss-on-ignition	(%)	2.1	1.6	1.8	<0.5	0.7	<0.5	<0.5	Not more than 7%
Sulphate Content, expressed as SO_3	(%)	0.60	0.90	0.70	1.40	1.20	1.40	1.3	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	(%)	6.4	9.1	5.5	14.2	10.6	16.0	15.4	Not more than 10.0%
K_2O	(%)	0.80	1.10	1.10	1.40	1.20	1.40	1.3	---
Na_2O	(%)	0.60	1.60	0.70	1.30	2.10	1.30	1.3	---
Total Alkali (Na_2O Eq.)	(%)	1.20	2.30	1.40	2.20	2.90	2.20	2.2	---

Note: 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		1900055	1900084	1900109	2000013	2000039	2000072	2000103	BS3892:Part 1: 1997
Date of Sample Received		27/06/2019	27/08/2019	23/10/2019	20/12/2019	13/03/2020	08/05/2020	07/07/2020	
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
Physical Properties									
Fineness	(%)	8.2	8.7	5.9	7.9	8.3	8.0	6.3	Not more than 12%
Particle Density	(kg/m^3)	2480	2370	2440	2420	2340	2330	2370	Not less than 2000 kg/m^3
Water Requirement	(%)	96	94	96	100	97	97	100	See Note
Strength Factor	---	0.79	0.78	0.73	0.69	0.80	0.83	0.76	See Note
Standard Consistentence	(%)	28.0	28.0	27.0	27.0	28.0	28.0	29.0	---
Initial Setting Time	(min)	225	255	195	245	195	180	190	Not less than the initial setting time of the Portland cement used
Soundness	(mm)	0.5	1.0	0.5	0.5	0.5	0.0	0.5	Not more than 10 mm
Portland Cement used									
Brand		Feng Jiang	Feng Jiang	Special Green Island	Special Green Island	Emerald	Emerald	Emerald	
Lab. Reference No.		1800070	1800070	1900049	1900049	2000003	2000003	2000003	
Initial Setting Time		105	105	120	120	125	125	125	
Chemical Composition									
Moisture Content	(%)	0.2	0.3	0.2	0.2	0.2	0.2	0.2	Not more than 0.5%
Loss-on-ignition	(%)	3.3	2.6	2.0	3.0	2.7	3.5	3.7	Not more than 7%
Sulphate Content, expressed as SO_3	(%)	0.6	0.6	0.7	0.5	<0.5	<0.5	<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	(%)	6.3	6.0	6.7	6.6	4.1	4.9	5.6	Not more than 10.0%
K_2O	(%)	1.20	1.20	1.20	1.10	1.00	1.00	0.9	---
Na_2O	(%)	0.90	0.90	1.20	0.90	0.80	1.10	0.8	---
Total Alkali (Na_2O Eq.)	(%)	1.70	1.70	2.00	1.60	1.50	1.80	1.8	---

Note: 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		1900056	1900085	1900110	2000014	2000040	2000073	2000104	BS3892:Part 1: 1997
Date of Sample Received		25/06/2019	27/08/2019	21/10/2019	18/12/2019	11/03/2020	06/05/2020	02/07/2020	
Country of Origin Stated By Client		China	China	China	China	China	China	China	Specification
Physical Properties									
Fineness	(%)	7.7	9.6	11.8	4.1	14.6	8.1	8.1	Not more than 12%
Particle Density	(kg/m^3)	2360	2420	2310	2440	2240	2300	2300	Not less than 2000 kg/m^3
Water Requirement	(%)	94	94	98	96	98	105	102	See Note
Strength Factor	---	0.78	0.78	0.70	0.77	0.81	0.75	0.80	See Note
Standard Consistentence	(%)	27.5	27.5	27.0	26.5	28.0	31.5	30.5	---
Initial Setting Time	(min)	240	250	205	280	195	210	200	Not less than the initial setting time of the Portland cement used
Soundness	(mm)	0.5	1.0	0.5	0.5	1.0	0.5	0.5	Not more than 10 mm
Portland Cement used									
Brand		Feng Jiang	Feng Jiang	Special Green Island	Special Green Island	Emerald	Emerald	Emerald	
Lab. Reference No.		1800070	1800070	1900049	1900049	2000003	2000003	2000003	
Initial Setting Time		105	105	120	120	125	125	125	
Chemical Composition									
Moisture Content	(%)	0.1	0.2	0.1	0.1	0.1	0.2	0.2	Not more than 0.5%
Loss-on-ignition	(%)	2.7	3.6	2.5	1.5	3.0	4.3	5.0	Not more than 7%
Sulphate Content, expressed as SO_3	(%)	1.0	0.9	0.5	1.0	0.6	<0.5	0.70	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	(%)	8.7	5.9	3.7	8.3	5.7	6.3	5.2	Not more than 10.0%
K_2O	(%)	1.10	1.40	0.60	1.40	1.10	0.70	0.6	---
Na_2O	(%)	1.50	1.40	1.70	1.20	1.00	0.80	0.9	---
Total Alkali (Na_2O Eq.)	(%)	2.30	2.30	2.10	2.10	1.70	1.30	1.3	---

Note: 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.