

OTHER BENEFITS

Compactibility

Cohesive and easily compactable concrete mixes can be effectively produced using TGC as shown in the pictures.



Singapore Cement recently completed construction of a new 24,000 metric tonne cement silo using TGC for the entire structure.



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DISCLAIMER

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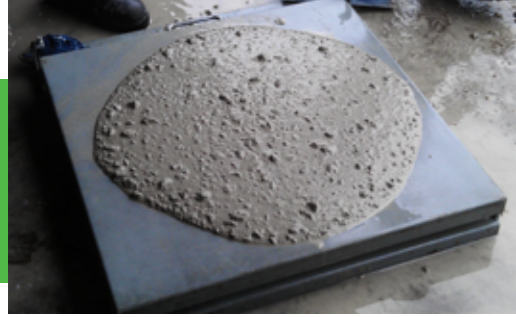
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TAIHEIYO GREEN CEMENT (TGC) Portland-fly ash cement

Singapore Cement Manufacturing Company (Private) Limited
is the sole distributor for Taiheiyō Green Cement in Singapore

www.hlasia.com.sg



Green cement is a cementitious material that meets or exceeds the functional performance capabilities of ordinary Portland cement by incorporating and optimizing recycled materials, thereby reducing consumption of natural raw materials, water, and energy, resulting in a more sustainable construction material.



TAIHEIYO GREEN CEMENT (TGC) Portland-fly ash cement

TAIHEIYO GREEN CEMENT (TGC) is the trade name of TAIHEIYO's factory-manufactured Portland-fly ash cement that meets both the quality and performance requirements of Singapore Standard SS EN 197-1:2014 Specification for Cement Part 1: Composition, specifications and conformity criteria for common cements.

TGC is a blend of Portland cement clinker (consisting predominantly of compounds formed from Calcium, Silica, Alumina and Iron) and PFA, or pulverized fuel ash (consisting predominantly of Silica and Alumina). PFA is the ash resulting from the burning of pulverized coal in coal-fired electricity power stations. The ash is very fine and it is removed from the flue gases by electrostatic precipitators.

Because the components of PFA are fine and spherical in shape, the workability of fresh concrete produced with Portland-fly ash cement is improved during pumping and casting.

In order to ensure stable quality, only PFA from specific designated power plants is utilized with very stringent quality control measures in place during the manufacturing process of TGC.

TGC has been specially designed to reduce the carbon intensity of cement production and the incorporation of PFA, a recycled raw material, contributes to a greener society.

ADVANTAGES

Compared to Portland Cement, TGC offers the following advantages:

- ✓ **Long-term strength development**
 The long-term strength of concrete made with TGC is enhanced due to the pozzolanic reaction between the calcium hydrate of ordinary Portland cement and the silica & alumina of the PFA.
- ✓ **Lower temperature rise**
 The lower heat of hydration reduces the risk of thermal cracking during curing. Low heat performance of TGC improves as the PFA content is increased.
- ✓ **Lower shrinkage**
 The lower w/c ratio required when using TGC reduces the risks of cracking due to drying shrinkage and autogenous shrinkage.
- ✓ **High durability**
 The stable characteristics of the dense hardened cement paste resulting from the pozzolanic reaction of the PFA produces a concrete with lower water penetration and higher chemical resistivity.
- ✓ **Improved workability**
 The fineness and spherical shape of the PFA particles produces a concrete with improved workability for pumping and casting with a reduced w/c ratio.

SPECIFICATIONS

TAIHEIYO GREEN CEMENT is manufactured to conform to the requirements of SS EN 197-1:2014

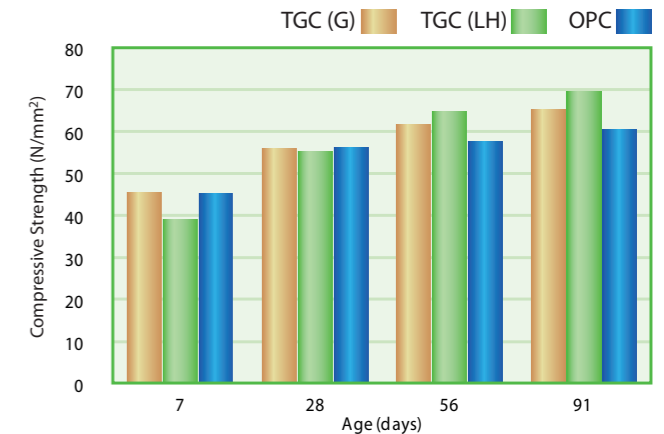
Items	SS EN 197-1:2014 specification	Test Method	TGC (G) General type	TGC (LH) Low Heat type
A. Physical requirements				
1. Initial setting time (min)	Not less than 75	BS EN 196-3:2005	150	155
2. Soundness (mm)	Not more than 10	BS EN 196-3:2005	0.5	0.5
3. Compressive strength (MPa)				
- 2 days	Not less than 10.0	BS EN 196-1:2005	22.5	18.2
-28 days	Not less than 42.5 and not more than 62.5	BS EN 196-1:2005	53.5	45.5
B. Chemical requirements				
1. Sulfate content (as SO ₃) (%)	Not more than 10	BS EN 196-2:2013	1.8	1.5
2. Chloride content (%)	Not more than 0.10	BS EN 196-2:2013	0.01	0.01
3. PFA content (%)	Not less than 6 and not more than 35	CAJS I-60-1982	6-20	21-35

CHARACTERISTICS

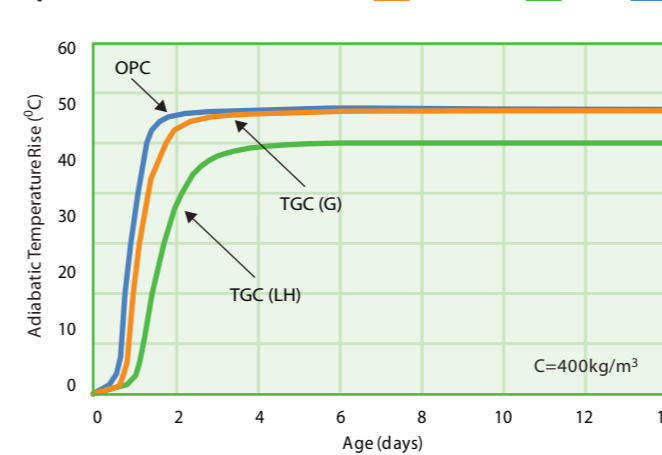
Strength

Chart: Concrete Mix Proportion

Type of Cement	W/C	Compressive Strength (N/mm ²)			
		7 days	28 days	56 days	91 days
OPC	0.45	45.4	56.3	57.6	60.6
TGC (G)	0.43	45.6	55.8	61.7	65.3
TGC (LH)	0.40	39.2	55.4	64.7	69.6

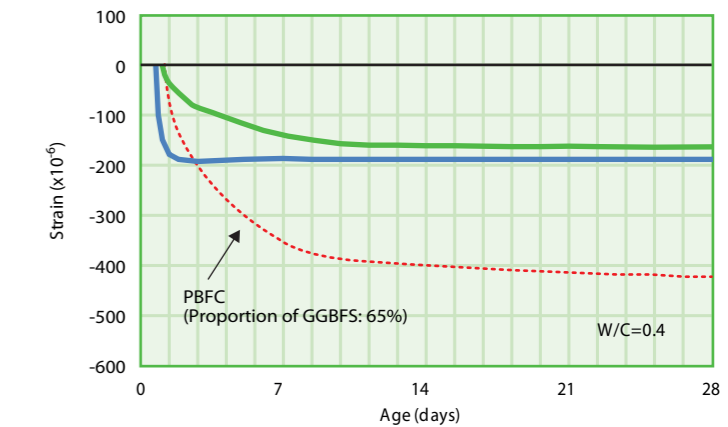


Temperature Rise



Autogenous Shrinkage

※ under Temperature Hysteresis



DURABILITY

