

# DuraCrete

Your greener choice for Strength, Durability & Sustainability

**DuraCrete** is a highly durable and sustainable green concrete that provides higher chemical resistance, higher strength, longer service life but lower Carbon Footprint.

It is a GreenLabel product approved under SGLS (Singapore Green Labelling Scheme). Minimum of 30% Portland cement in DuraCrete is replaced by EnGro's other GreenLabel product - "VCEM" ground granulated blastfurnace slag (GGBS).

DuraCrete is also the first low carbon concrete product in Singapore to be independently audited for its CO<sub>2</sub> emissions i.e. Carbon Footprint assessment. The embodied carbon content in DuraCrete is 25% - 70% lower than normal concrete using CEM I (Portland cement), depending on its GGBS content.

## TECHNICAL PROPERTIES

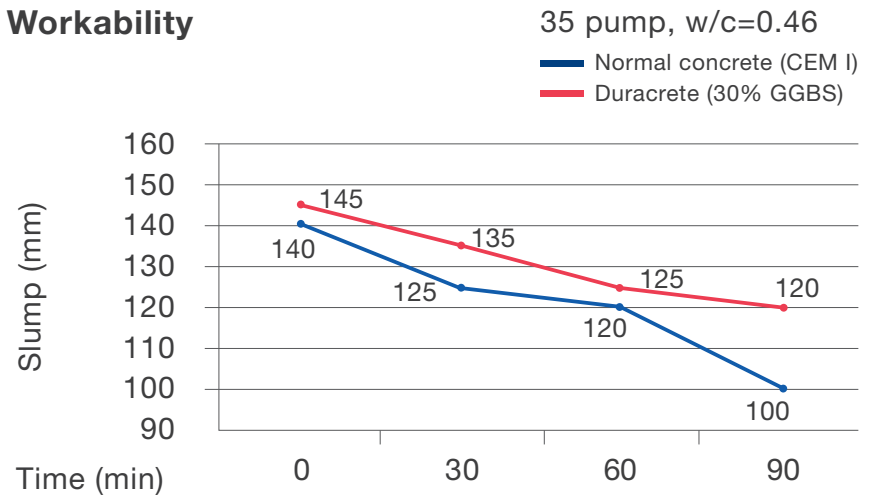
<b>Density</b>	Approx. 2295 kg/m <sup>3</sup>
<b>Binder used</b>	Portland-Slag Cement, CEM II/B-S, 30% - 35% GGBS. Blastfurnace Cement, CEM III/A, CEM III/B, 36% - 80% GGBS. (SS EN 197- 1: 2008)
<b>Aggregates used</b>	Natural Aggregates

## BENEFITS

Compared to CEM I (Portland cement) concrete

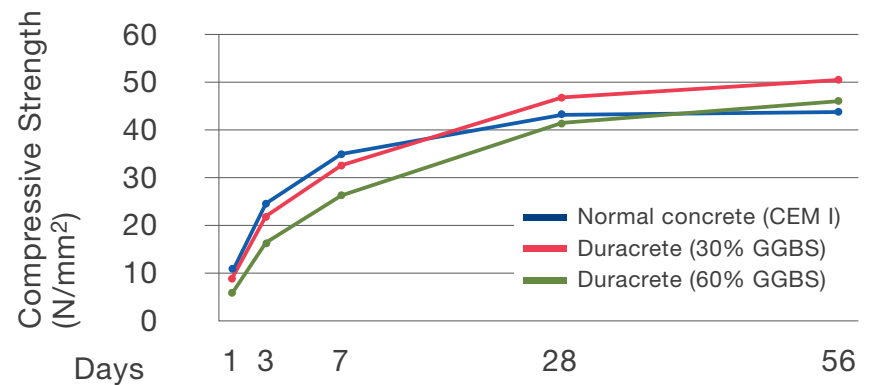
- Significant reduction of embodied CO<sub>2</sub>
- Improved concrete workability and less bleeding
- Superior ultimate strength
- Lower permeability
- Lower early-age temperature rise
- Minimize risk of damaging internal reactions such as Alkali-Silica Reactions (ASR)
- Higher resistance to chloride and sulphate attacks
- Better protection against reinforcement corrosion
- Lighter in color, less urban heat island effect
- Low chromate content, Cr(VI) < 2ppm

## Workability



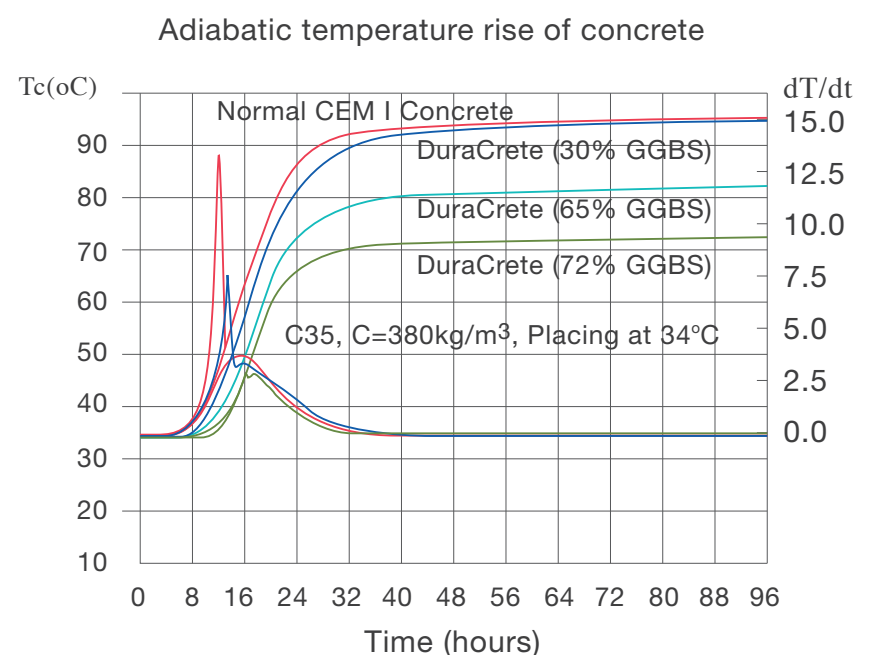
Under the same mix proportion, DuraCrete provides better workability with better slump retention than normal CEM I (Portland cement) concrete.

## Strength Development (C35 Pump, w/c=0.46)



DuraCrete with 30% GGBS has slightly lower early strengths compared to normal CEM I (Portland cement) concrete. Its superior long-term strength provides a higher safety margin for the structure.

## Temperature Rise



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Ready-Mix Concrete  
(Grade 35)

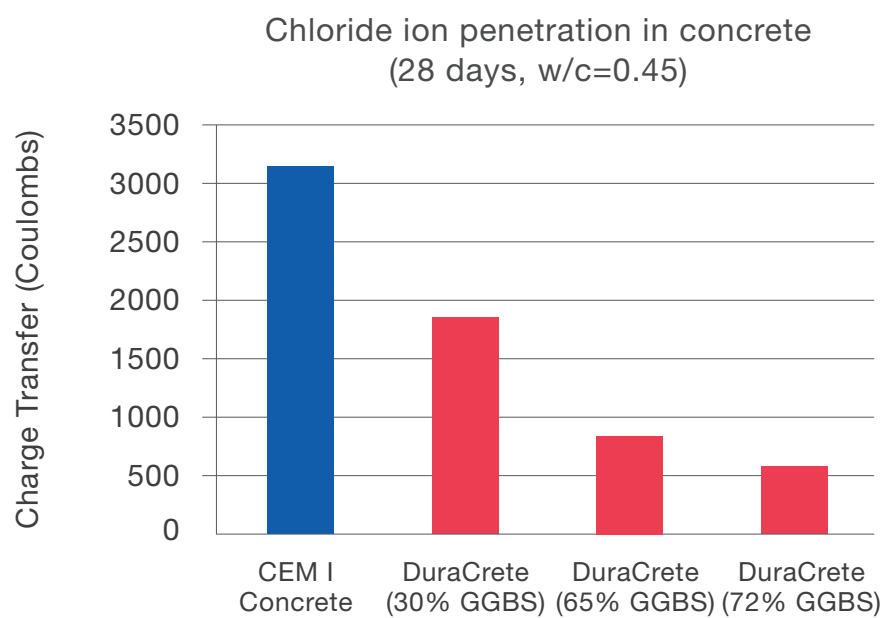
Identification Number: 022-009  
Eco Friendly Building Material  
Recycled Content: 30%-75%  
Carbon Emission Value: 100-260kg/m<sup>3</sup>

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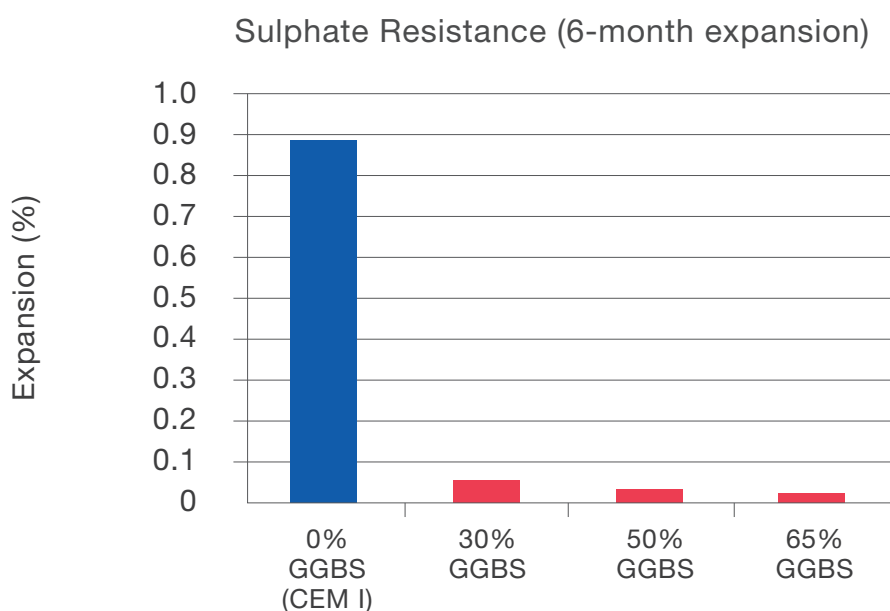
The presence of GGBS in DuraCrete causes significant reduction on the peak temperature and its rising rate. Thus, the risk of early-age thermal cracking is substantially reduced.

## Resistance to Chloride Penetration - (ASTM C1202)



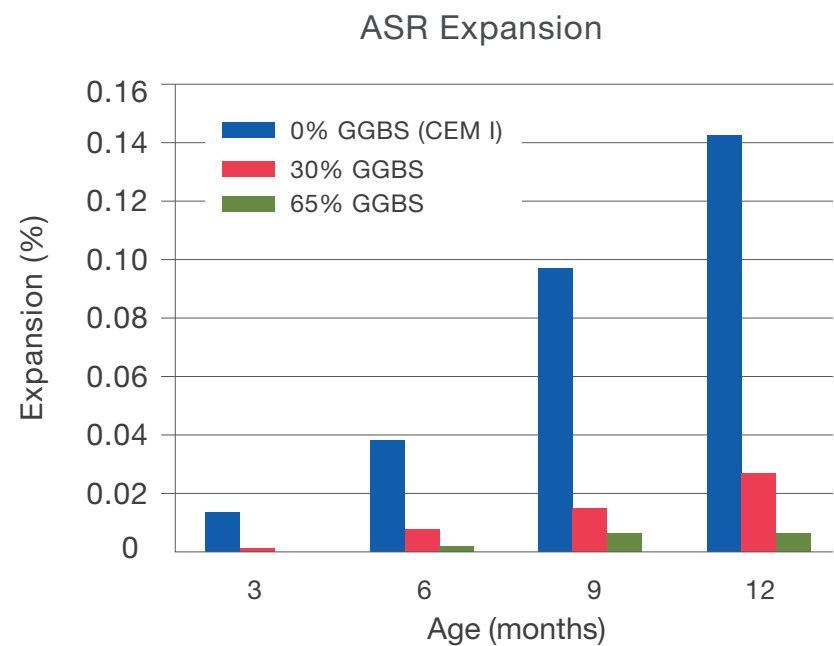
Chloride ions can cause corrosion and expansion of the steel reinforcements. Generally, concrete with higher GGBS content has lower permeability and better chloride resistance.

## Resistance to Sulphate Attack - (ASTM C1012)



Sulphates can react with  $C_3A$  and  $Ca(OH)_2$  in the concrete and form Ettringite, which cause severe expansion and cracking. Presence of GGBS in DuraCrete reduces the amount of  $C_3A$  and  $Ca(OH)_2$ . At high levels of GGBS content, DuraCrete provides a much stronger sulphate resistance than traditional Sulphate Resisting Concrete at much lower cost.

## Resistance to Alkali-Silica Reaction - (ASTM C227)



The alkali-silica reaction (ASR) occurs between the alkalis in Portland cement and siliceous aggregates to form an expansive gel that leads to cracking and expansion of the concrete. The use of DuraCrete can effectively minimize the risk of ASR. DuraCrete's low permeability also reduces the mobility of ASR.

## FIELDS OF APPLICATION

DuraCrete can be used in all construction fields, especially those under aggressive chemical environments such as sewage and marine structures, etc.

Applications	Recommended GGBS content in DuraCrete
General Construction, including pre-casting	30%
High Sulphate/Chloride Resistance	At least 65%
High ASR Resistance	50% to 70%
Thermal stressing control for mass concrete casting	Generally 50% to 75%

## GREEN MARK BENEFITS

Compared to CEM I (Portland cement) concrete

- As a GreenLabel product, using DuraCrete helps to gain green mark points.

Results may vary under different testing conditions. All information contained herein is not a warranty of any kind and is for use as product information only. The company is continually engaging in research, hence it reserves the right to update the information where necessary accordingly, without notice.



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