HIGH PERFORMANCE (HP) SLAG

featuring GREEN**CEM**™ technology

Cement Australia's High Performance (HP) Slag is a supplementary cementitious material (SCM) that enables reduced CO_2 in concrete through increased replacement of GP Cement, without compromising strength performance.

HP Slag is a premium GGBFS (Ground Granulated Blast Furnace Slag) that fully complies with the requirements for GGBFS in Australian Standard AS3582.2 – *Supplementary cementitious materials for use with General Purpose and blended cement.*

In addition to the benefits of GGBS such as reduced heat of hydration, reduced concrete permeability, and enhanced durability, HP Slag also provides low drying shrinkage and high early age strength.

HP Slag is suitable for premixed and pre-cast concrete applications.

- Reduces embodied CO_2 in concrete without compromising strength performance
- Sourced within Australia and reduces landfill waste
- Improves early age strength and drying shrinkage

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Enabling Low Carbon Concrete Mixes

Based on AusLCI intensity factors (Table 1), the embodied carbon of GP Cement is nearly 5 times that of GGBFS.

Until now, the downside of replacing a significant proportion of GP cement with GGBFS has been reduced concrete performance.

Table 1: Intensity factors. Life Cycle Inventory (LCI) Stages A1-A2.
*taken from Infrastructure Sustainability Materials Calculator V2.0.13 (LCI 2021)**

Name	LCI Source	Global Warming Potential (kg CO_2e/tonne)
Cement	AusLCI	966.9
Coarse Aggregates (Gravel, crushed)	AusLCI Shadow Database	10.5
Fine Aggregates (Sand)	AusLCI Shadow Database	4.2
Fly Ash	AusLCI	19.8
GGBF Slag	AusLCI	192.2

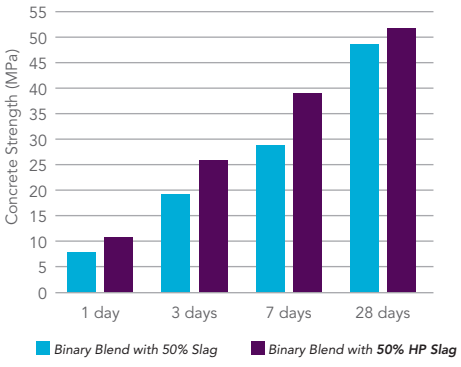
Cement Australia's HP Slag, featuring GREENCEM™ technology, enables higher levels of cement replacement, whilst maintaining or improving concrete performance relative to conventional concrete mix designs.

Replacement of 70% HP Slag in binary blends provides an embodied carbon reduction of up to 56% relative to GP Cement^.

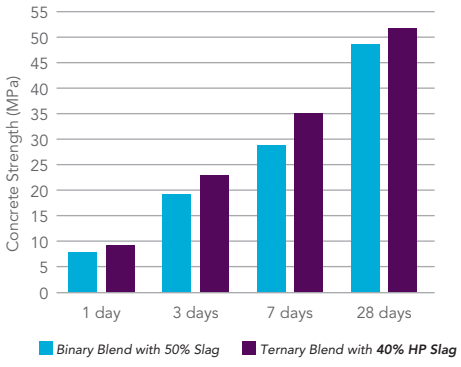
In ternary blends, where HP Slag is used in combination with Fly Ash, even higher levels of cement replacement in concrete are achievable whilst maintaining or improving concrete performance relative to conventional concrete mix designs.

A combination of HP Slag and Fly Ash can achieve up to 80% cement replacement, which provides an embodied carbon reduction in concrete of up to 70% relative to GP Cement.

40MPa Binary Blend
(50% GP Cement, 50% HP Slag)



40MPa Ternary Blend
(50% GP Cement, 40% HP Slag, 10% Ash)



Data provided in theses graphs was achieved by testing conducted in a controlled laboratory environment using Australian Standards test methods at a NATA registered laboratory. Graphs should be used as an indicative guide only as various factors can impact final strength results in field trial conditions.

** Source: "Supplementary Cementitious Materials" May 2024 - Dept of Climate Change, Energy, the Environment and Water, NSW*

^ based on AusLCI intensity factors. Source: https://www.auslci.com.au/index.php/EmissionFactors

GREENCEM™ Technology, inclusive of HP Ash, HP Slag and HP GB, is only available in select locations, as a component of a broader cementitious offering. Prior to supply, Cement Australia's technical team is required to conduct a technical assessment of the existing mix design, to determine the suitability for the application.

Ground Granulated Blast Furnace Slag (GGBFS) is a by-product of iron and steel-making, ground into a fine powder.

It is commonly used as a 30% – 50% cement replacement in concrete in virtually all conventional concrete applications.

Cement Australia's HP Slag is sourced exclusively from Australian iron and steel manufacturers, making it the the best choice for reducing CO_2 in concrete, whilst reducing waste going to landfill.

KEY BENEFITS of Cement Australia's HP Slag

- Enables a significant reduction of embodied CO_2 in concrete through increased replacement of GP Cement
- Reduces waste going to landfill
- High early strength development compared with standard slag
- Reduced efflorescence
- Lower drying shrinkage
- Enhanced durability and workability
- Improved resistance to chemical attack and chloride penetration
- Reduced potential for Alkali Aggregate Reactions (ASR)

To find out if High Performace (HP) Slag is suitable for your project, **please contact the Cement Australia Technical Team**

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