

Special Purpose Cement

PRODUCT DATA SHEET

BORAL

Boral Cement's Blue Circle® Special Purpose Cement

complies with AS 3972 as a type GB, type LH and type SR cement. It is a specially blended cement, which provides a lower heat of hydration and superior sulfate, chloride and salt water resistance when compared to General Purpose cement.

USES

Blue Circle® Special Purpose Cement may be used in marine applications, in mass concrete where reduced heat liberation is important or in aggressive sulfate-rich environments where increased resistance to salt attack is required. Where concrete is expected to be in contact with sulfates or other aggressive salts or solutions, analytical surveys must be completed and appropriate grade of concrete selected. As with General Purpose cements, the resistance to acid solutions is limited, but concrete life expectancy will be maximised by using **Blue Circle® Special Purpose Cement** at high cement content and low water to cement ratio in fully compacted and cured concrete.

PROPERTIES

The performance of the cement when tested using Australian Standard test methods under standard conditions will typically be within these ranges.

Special Purpose Cement	AS 3972 LH/SR	
Setting Time:	Typical:	Requirement:
Initial	2-4 hrs	45 minutes min
Final	3-5 hrs	10 hrs max
Soundness	0-1 mm	5 mm max
Sulfate Resist.	150-400 microstrain	750 microstrain max
Peak Temp. Rise	19-23°C	23°C max
Comp. Strength:		
7 day	23-35 MPa	20 MPa min
28 day	45-60 MPa	35 MPa min

COMPATIBILITY

Blending with other products is not recommended as this may adversely influence the resistance of concrete to chemical attack and alter the heat evolution properties. **Blue Circle® Special Purpose Cement** is compatible with admixtures complying with AS 1478.

SULFATE RESISTANCE

The Sulfate Resistance Test is based on the expansion of a thin mortar bar soaked in a sodium sulfate solution. Australian Standard AS 3972 specifies an upper limit of 750 microstrain expansion for Type SR cement. Typically, **Blue Circle® Special Purpose Cement** mortar bar expansion is below 400 microstrain.

HEAT EVOLUTION

Australian Standard AS 3972 limits the peak temperature rise of Type LH cement to below 23 degrees when tested in accordance with AS 2350.7 – Langavant Test. **Blue Circle® Special Purpose Cement** complies with AS 3972 for a low heat cement and the peak temperature rise is significantly lower than conventional General Purpose cements.

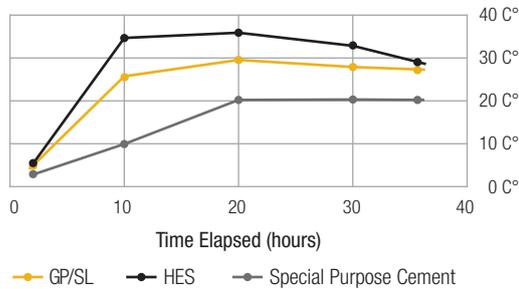
The following graph demonstrates the heat evolution of **Blue Circle® GP Cement**, **Blue Circle® High Early Strength (HES)** and **Blue Circle® Special Purpose Cements**.



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HEAT EVOLUTION OVER TIME

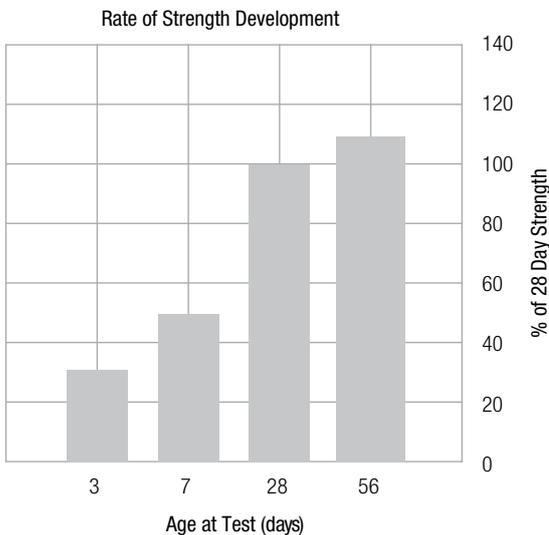


USE IN CONCRETE

CONCRETE PROPERTIES

The composition of **Blue Circle® Special Purpose Cement** is formulated to deliver lower heat of hydration and superior sulfate and chloride resistance compared with General Purpose Cement. This results in slower strength development by the **Blue Circle® Special Purpose Cement**, with significantly lower early age strength but a greater potential for later age strength development.

The following graph gives an indication of the rate of strength development of **Blue Circle® Special Purpose Cement**.



Note: The strength development given in the chart is based on concrete tested under laboratory conditions. Strength development will be slower as the ambient temperature drops.

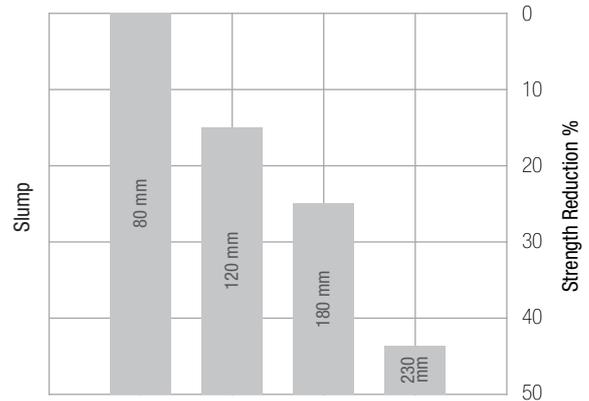
EFFECT OF EXCESS WATER

Use only the minimum amount of water to mix and place concrete. Excess water will have a detrimental effect on the compressive strength and other properties of concrete. The following graph shows the reduction in concrete strength with increased water addition.

Other factors that will influence the strength and durability of concrete containing **Blue Circle® Special Purpose Cement** are:

- Mix design, including admixtures
- Temperature - ambient and materials
- Air content
- Compaction of concrete
- Curing of concrete.

Effect of Excess Water on Concrete Strength and Slump



Extra water added: litres per cubic metre
To achieve slumps greater than 80mm and the resulting reduction in strength as %.

MIX DESIGN

Dense, fully compacted concrete of low permeability is essential to minimise the aggressive effects of sulfate and chloride attack.

Careful selection of mix components is essential and reference should be made to:

- AS 1379 - The Specification and Manufacture of Concrete
- AS 3600 - Concrete Structures.

Dissolved salts and organic matter in sands and aggregates may adversely effect the strength, durability and appearance of concrete. AS 1379 gives requirements for material quality and mixing of readymixed concrete.

Seek professional advice from the relevant specifier/engineer for the most appropriate mix design prior to application.

PLACING

The concrete should be compacted and given a suitable finish. Adequate cover to steel reinforcement is required to avoid corrosion.

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USE IN MORTARS

MIX DESIGN

The Australian Standard for Masonry structures, AS3700, provides guidance on the mix design for mortars in most exposure conditions. For conditions not covered by AS3700 seek professional advice from the specifier or engineer to determine the most appropriate mix design prior to application.

Sand should be clean and well graded. Salts and organic matter may adversely affect the workability, strength and durability of the mortar.

MIXING

For concretes and mortars the constituents should be thoroughly mixed using clean potable water.

CURING

Fresh concrete or mortar must be protected from the loss of moisture. Moist curing will significantly improve the compressive strength and durability of concretes and mortars.

Curing will also effect concrete properties in terms of:

- Reduction in potential plastic shrinkage cracking
- Improved surface quality with respect to abrasion resistance
- Reduction in air permeability
- Reduction in the carbonation rate.

AVAILABILITY

Blue Circle® Special Purpose Cement is available in 20kg multi-walled paper sacks.

CLEANUP AND STORAGE

Clean all tools and equipment with water promptly after use. Sweep or vacuum cement powder and avoid generating dust.

Bags are not waterproof. Contact with air and moisture will cause hydration of cement. Opened bags of **Blue Circle® Special Purpose Cement** should be discarded. Unopened bags can be stored in dry conditions off the ground. However, over time cement will deteriorate as it absorbs moisture.

SAFE HANDLING

Both dry and wet cement are hazardous and must be handled with care. Exposure to dry cement dust can irritate the eyes, skin, nose, throat and upper respiratory system. Wet cement is alkaline and can cause skin irritation and burn the skin and eyes.

Avoid direct contact with both dry and wet cement. Wear suitable protective clothing including gloves, barrier cream, goggles and a face mask. If cement comes into contact with the skin or eyes - wash it off immediately.

Wherever possible, use mechanical aids or share the load with another person. Seek medical assistance if the cement causes a physical injury

Follow the instructions on the bag and for more safety information, read the Safety Data Sheet, which is available from the website www.boral.com.au.

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