

General Purpose Cement

PRODUCT DATA SHEET

BORAL

Boral Cement's Blue Circle® General Purpose Cement

exceeds the requirements for a Type GP cement in the Australian Standard AS 3972 - General purpose and blended cements.

USES

General Purpose or '**Blue Circle® GP Cement**' is suitable for professional tradespeople and for jobs around the house for a broad range of applications including.

- Concrete
- Mortars
- Renders
- Grouts

Where concrete or mortar has a specific requirement for resistance to sulfate or chloride attack, **Blue Circle® Special Purpose Cement** is more appropriate.

PROPERTIES

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

Property	GP Cement	AS 3972
Setting Time:	Typical:	Requirement:
Initial	1.5 - 3 hrs	45 minutes min
Final	2.5 - 4 hrs	6 hrs max
Soundness	1.0 mm	5.0 mm max
Comp. Strength:		
3 day	25 - 38 MPa	
7 day	36 - 51 MPa	35 MPa min
28 day	54 - 64 MPa	45 MPa min

COMPATIBILITY

Blue Circle® GP Cement may be blended with other cements complying with AS 3972 (General purpose and blended cements) or fly ash complying with AS3582.1 (Supplementary cementitious materials - fly ash). The blend however would have different properties to those given in the previous table.

Blue Circle® GP Cement is also compatible with admixtures complying with AS 1478.1 (Admixtures for concrete, mortar and grout). Admixtures should be added in accordance with the manufacturer's recommendations.

COLOUR

General Purpose cement has a typical cement grey colour. For projects requiring a consistent colour the use of one type of cement for the entire project is recommended.

BATCHING

For mortars and concrete accurate measurement of each constituent including water and admixtures is essential to producing a satisfactory and consistent product. Measurement can be by weight or by volume however the mix designs suggested in this product data sheet are based on volume batching.

When batching by volume containers with a known volume such as buckets should be used for cement, sand and water, smaller containers are required for admixtures. Measuring volumes by shovel or trowel is not sufficiently accurate.



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MORTAR AND RENDER PROPERTIES - MIX CONSTITUENTS

Blue Circle® GP Cement is suitable for the manufacture of mortar and render mix designs for different exposure conditions as given below. The quality of the other constituents however will have a significant impact on the strength and durability of the final product.

Use clean water and sands that do not have an excessive amount of silt or clay. Plasticisers and water thickeners may be used but must be added strictly in accordance with the manufacturer's instructions as a serious loss of compressive strength and bond strength may occur if these products are overdosed.

Hydrated lime (or Blue Circle's X-lime) is recommended if improved workability is desired.

MIX DESIGN

The following table provides recommended mortar mix designs for various exposure conditions. Refer to AS 3700 (Masonry structures) for more detailed instructions.

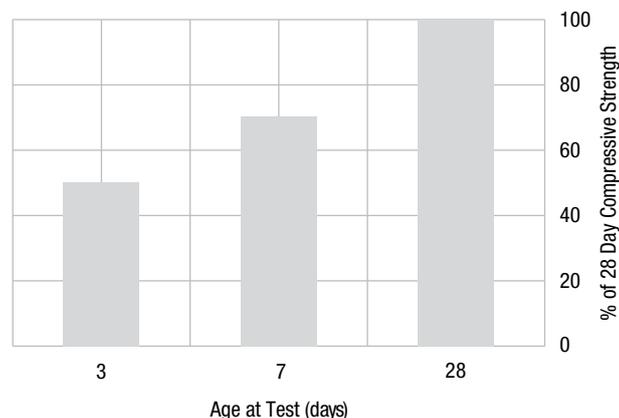
Application	Mortar Class (AS 3700)	GP	Hydrated Lime	Sand
General use	M3	1	1	6
Severe Exposure * Subject to saline wetting and drying * Aggressive soils * Industrial * Severe marine	M4	1	0.5	4.5
General rendering	N/A	1	0.5	4

CONCRETE PROPERTIES - MIX CONSTITUENTS

Blue Circle® GP Cement is suitable for the manufacture of concrete and mix designs for different applications are given below. The quality of the other constituents however will have a significant impact on the strength and durability of the final product.

STRENGTH DEVELOPMENT

The following graph gives indicative data on the strength development of concrete containing Boral's General Purpose Cement.



Cement Content = 320kg/m³ Slump = 80mm

The data is based on concrete tested under laboratory conditions. The strength development in the field will be dependent on the ambient conditions.

MIX DESIGN

Blue Circle® GP Cement is suitable for most concrete applications. Where it is proposed for use in structural applications refer to the Australian Standard AS 1379 (Specification and supply of concrete). If the concrete is to be used in a severe environment the durability requirements of the concrete should be assessed by a professional engineer.

As a guide for non-structural concrete in a benign environment the following mix designs can be used.

Application	GP Cement	Sand	Stone/Gravel
Foundations and Footings	1	3	5
General use: Paths etc.	1	2.5	4
Higher Strength	1	2	3

Figures shown are parts by volume

MIXING

If mixing concrete by hand, thoroughly mix all the aggregates and the cement before adding any water. Then add the minimum amount of water required to achieve the desired workability and mix again.

If using a concrete mixer, mix the concrete in accordance with the manufacturers recommendations. For ready mix concrete refer to the requirements of the Australian Standard AS1379 (Specification and supply of concrete).

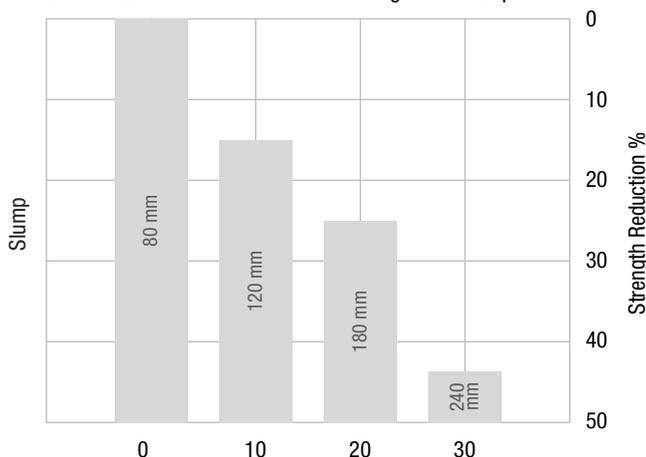
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EFFECT OF EXCESS WATER

Use only the minimum amount of water to mix and place the 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.

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 %.

Other factors that will effect the strength and durability of concrete:

- Mix design including admixtures
- Temperature - ambient and that of the materials
- Air content
- Compaction
- Curing.

PLACING AND FINISHING

The concrete should be compacted and given a suitable finish.

Adequate cover to the reinforcing is required to avoid corrosion.

The Australian Standard AS 3600 - (Concrete structures) provides the requirements for the depth of cover.

CURING

Concrete should be prevented from drying out for at least 7 days by either keeping the surface wet, covering the surface with plastic or applying a curing compound that complies with AS 3799 (Liquid membrane-forming curing compounds for concrete).

If a consistent colour is required using plastic sheeting is not recommended.

Good curing will have the following benefits:

- Improve compressive and flexural strength.
- Reduction in the potential for plastic shrinkage cracking.
- Improved abrasion resistance.
- Reduction in the carbonation rate which will reduce the likelihood of reinforcement corrosion.

AVAILABILITY

Blue Circle® GP Cement is available in 20kg multiwall papers sack and also smaller handypacks in plastic bags.

CLEANUP AND STORAGE

Avoid generating dust. Clean up by vacuum or sweeping.

Contact with air and moisture will cause hydration of the cement and alter the cement properties. The 'shelf life' of **Blue Circle® GP Cement** is, therefore, dependent on the storage conditions.

Bag product should be stored off the ground and stacked to allow free circulation of air. Bags are not waterproof. It is recommended that **Blue Circle® GP Cement** be tested prior to use if the age of the cement exceeds three months or earlier if the storage conditions are not ideal.

SAFE HANDLING

Both dry and wet cement are hazardous and must be handled with care.

Exposure to dry cement dust can irritate eyes, skin, nose, throat and the upper respiratory system. Wet cement is alkaline and can cause skin irritation and can burn 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 skin or eyes wash it off immediately.

Where 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 (SDS)** which is available from the web site www.boral.com.au.

The information in this Data Sheet and any advice given should be viewed as a guide only. Boral makes no guarantee of the accuracy or completeness of the information and recommends you conduct your own testing to determine suitability for your specific purpose. Boral, the Boral logo, boral.com.au, Build something great and Blue Circle are trade marks or registered trade marks of Boral Limited in Australia, other countries, or both. Particular projects may require the use of specific construction techniques or products. Boral recommends obtaining technical advice prior to construction. To ensure the information you are using is current, Boral recommends you review the latest building information available on the Boral website.

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