Builders Cement

PRODUCT DATA SHEET

Boral Cements Blue Circle® Builders Cement is a blend of portland cement and ground granulated blast furnace slag. It exceeds the requirements for a type GB (General blended) cement specified in the Australian Standard AS3972 (General purpose and blended cements) and can be used as a replacement for General Purpose cement in most applications.

USES

Blue Circle® Builders Cement is suitable for professional trades people and for jobs around the house for a broad range of applications including:

• Concrete • Mortars • Renders • Grouts

Builders cement can be used as a replacement for General Purpose cement for applications where high early age strength is not required. 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 Builders Cement when tested using Australian standard test methods under standard conditions will typically be within the ranges given in the following table.

Property	Builders Cement	AS 3972
Setting Time:	**Typical:**	**Requirement:**
Initial	2 - 3 hours	45minutes min
Final	3 - 4 hours	10hrs max
Soundness:	1.0mm	5.0mm max
Fineness	330-430m²/kg	
Comp. Strength:		
3 day	16 - 25 MPa	
7 day	25 - 35 MPa	20 MPa min
28 day	50 - 60 MPa	35 MPa min

COMPATIBILITY

Blue Circle® Builders Cement may be blended with other cements complying with AS3972 (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® Builders Cement is also compatible with admixtures complying with AS1478 (Admixtures for concrete, mortar and grout). Admixtures should be used in accordance with the manufacturer's recommendations.

COLOUR

Builders Cement is lighter in colour than General Purpose cement but not as light as Off White cement. For colour sensitive projects use one type of cement for the whole project.

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® Builders Cement is suitable for the manufacture of mortar and render and mix designs for different exposure conditions are 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)	Cement	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

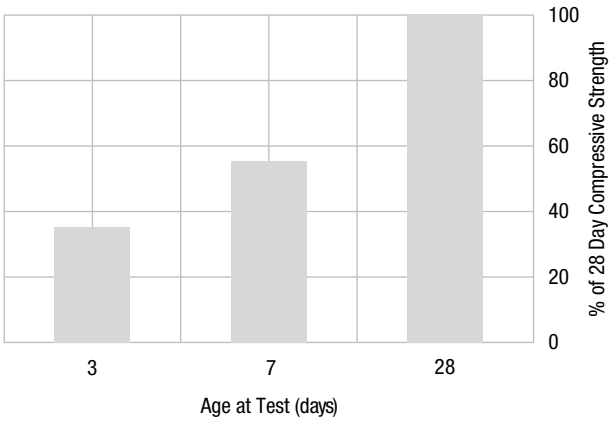
Blue Circle® Builders Cement is suitable for the manufacture of concrete and mix designs for different applications are given below. The quality of the other constituents however will have a significant impact on the strength and durability of the final product.

Use sand and coarse aggregate (blue metal and gravel) that are well graded and clean. The Australian Standard AS2758.1 specifies the requirements for coarse aggregates and sand used for concrete.

Use clean water. Water containing dissolved salts or organic matter will adversely affect the strength, durability and appearance of the concrete. The Australian Standard AS1379 (Specification and supply of concrete) includes requirements for the quality of water used for concrete.

STRENGTH DEVELOPMENT

The following graph gives indicative data on the strength development of concrete containing **Blue Circle® Builders 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® Builders 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	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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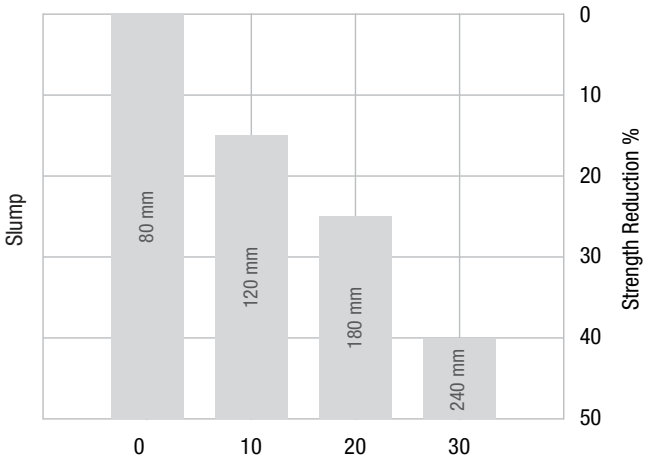
EFFECT OF EXCESS WATER

Use only the minimum amount of water to mix and place the concrete. Excess water will have a detrimental affect 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® Builders Cement is available in 20kg multi-walled paper sacks.

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® Builders 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® Builders 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.

Boral Cement
ABN: 62 008 528 523

Product Support
NSW, ACT & QLD:
Telephone: 1800 721 258
VIC, SA, TAS:
Telephone: 1800 673 571

www.boral.com.au

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