

Blue Circle® Builders Cement

Boral Cement's 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 AS 3972 (General purpose and blended cements) and can be used as a replacement for General Purpose cement in most applications.

FEATURES AND BENEFITS

- Traditional Ordinary Portland Cement (OPC) conforming to AS 3972 Type GP.
- Used by both the professional and the home handyman.

TYPICAL APPLICATIONS

Blue Circle® Builders Cement is suitable for a broad range of applications including concrete, mortar, render, grout and screed.

Blue Circle® 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 Blue Circle® 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	45 minutes min.
Final	3-4 hours	10 hours max.
Soundness	1.0mm	5.0mm max.
Fineness	330-430m ² /kg	
Comp. Strength:		
3 days	16-25 MPa	Not specified
7 days	25-35 MPa	20 MPa minimum
28 days	45-55 MPa	35 MPa minimum

COMPATIBILITY

Blue Circle® Builders Cement may be blended with other cements complying with AS 3972 (General purpose and blended cements) or fly ash complying with AS 3582.1 (Supplementary cementitious materials – fly ash). However, the blend would have different properties to those given in the previous table.

Blue Circle® Builders Cement is also compatible with admixtures complying with AS 1478 (Admixtures for concrete, mortar and grout). Admixtures should be used in accordance with the manufacturer's recommendations.

COLOUR

Blue Circle® Builders Cement is lighter in colour than Blue Circle® General Purpose Cement but not as light as Blue Circle® 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.

MORTAR AND RENDER PROPERTIES

Mix constituents

Blue Circle® Builders Cement is suitable for the manufacture of mortar and render. Mix designs for different exposure conditions as given below. However, the quality of the other constituents 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 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	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 per volume

Mortar and Render - Suggested mix proportions by volume

Application	Mortar Class (AS 3700)	Cement	Sand	Hydrated Lime
General use	M3	1	6	1
Severe exposure	M4	1	4.5	0.5
* External use (Within 1km from the coast and areas affected by sea air on spray)				
* Aggressive soils				
* Industrial				
* Severe marine				
General rendering	NA	1	4.0	0.5



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CONCRETE PROPERTIES

Mix constituents

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

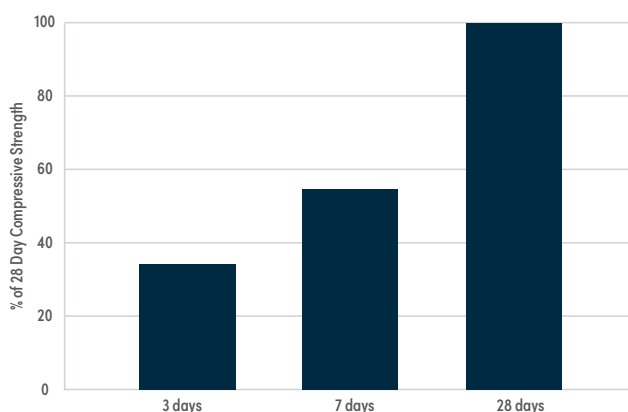
Use sand and coarse aggregate (blue metal and gravel) that are well graded and clean. The Australian Standard AS 2758.1 specifies the requirements for coarse aggregates and sand used for concrete.

Use clean water. Water containing dissolved salts or organic matter will adversely affect the strength, durability and appearance of the concrete.

The Australian Standard AS 1379 (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.

Mixing

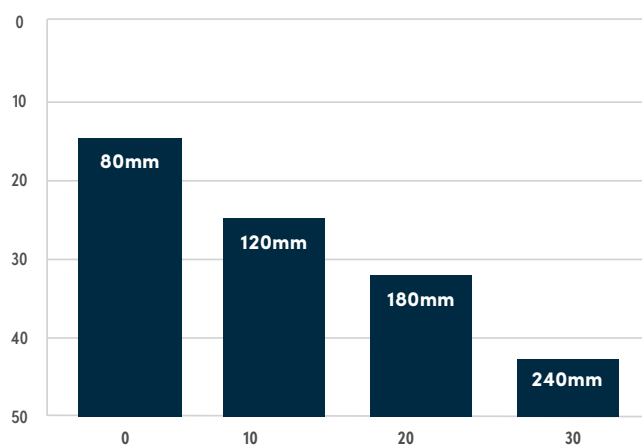
If mixing concrete by hand, thoroughly mix all the aggregates and the cement before adding any water. Then add the minimum amount of water required to achieve the desired workability and mix again. If using a concrete mixer, mix the concrete in accordance with the manufacturers recommendations. For ready mix concrete refer to the requirements of the Australian Standard AS 1379 (Specification and supply of concrete).

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.

Effect of excess water on concrete strength and slump



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) provide the requirements for the depth of cover.

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CURING

Concrete should be prevented from drying out for at least seven 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). Using plastic sheeting is not recommended when a consistent colour is required. 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 that will reduce the likelihood of reinforcement corrosion.

AVAILABILITY

Blue Circle® Builders Cement is available in 20kg multi-layered paper sacks.

CLEAN UP AND STORAGE

Clean all tools and equipment with water promptly after use.

Clean up by vacuum or using wet methods. Avoid dry sweeping.

All cement-based products need to be stored sealed in a cool, dry environment, under cover and off the ground wherever possible. Contact with moisture, including humid conditions, will cause hydration to commence and reduce shelf life considerably. It is recommended to dispose of any cement-based products more than 12 months old.

SAFE HANDLING

This product may contain small amounts of Respirable Crystalline Silica and trace amounts of hexavalent chromium.

Avoid generating dust wherever possible. Use dust capture or otherwise use in well ventilated areas.

When cutting or abrading concrete keep it wetted with water to avoid creating hazardous dust.

Use personal protection equipment against exposure and alkali burns.

The use of goggles, well-fitted P2 dust masks or better, barrier creams and rubber gloves is recommended. Wash product off unprotected skin immediately with water.

Manual handling of bagged products without proper training may result in personal injury. Wherever possible you should use mechanical aids or share the load with another person.

For further safety information consult the Safety Data Sheet for the product available at www.boral.com.au/cement

IMPORTANT NOTE

The information and/or specifications contained herein are given in good faith as being true and accurate but no liability is accepted by us, our employees, distributors, representatives, or agents for any loss or damage, direct or indirect, resulting from using the information, following the specifications or adopting recommendations and/or suggestions as actual conditions of use are beyond our control.

PRODUCT SUPPORT

New South Wales

Building T2, 39 Delhi Rd,
North Ryde NSW 2113

Telephone (02) 9033 4000

Facsimile (02) 9033 4055

Victoria/ Tasmania

Telephone 1800 673 570

Product Support

Telephone 1800 721 258

www.boral.com.au

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