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.

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

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.
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.

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

MORTAR AND RENDER 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.

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.

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 concrete mix designs for various applications. Refer to the Australian Standard AS1379 (Specification and supply of concrete).

<table>
<thead>
<tr>
<th>Application</th>
<th>GP Cement</th>
<th>Sand</th>
<th>Stone/Gravel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foundations and Footings</td>
<td>1</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>General use: Paths etc.</td>
<td>1</td>
<td>2.5</td>
<td>4</td>
</tr>
<tr>
<td>Higher Strength</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

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

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).
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

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.

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.