**Boral Cements Blue Circle® High Early Strength Cement** is a special purpose cement complying with AS 3972, Type HE. It is manufactured from specially prepared Portland cement clinker and gypsum. Boral Cements Blue Circle® High Early Strength Cement is more finely round than Blue Circle® SL cement, but is chemically similar.

**USES**

Blue Circle® High Early Strength Cement can replace General Purpose Cement in all applications but is commonly specified where higher than normal early strengths are required. Examples of areas where Blue Circle® High Early Strength Cement may be used are concrete product applications (roof tiles and masonry blocks), precast and tilt-up concrete and where early stripping of formwork is desired.

**CEMENT PROPERTIES**

The following table provides an example of some typical cement properties for Blue Circle® High Early Strength Cement.

<table>
<thead>
<tr>
<th>High Early Strength Cement</th>
<th>AS 3972 Type HE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Setting Time:</strong></td>
<td><strong>Typical:</strong></td>
</tr>
<tr>
<td>Initial</td>
<td>1.5 - 3 hours</td>
</tr>
<tr>
<td>Final</td>
<td>2.5 - 4 hours</td>
</tr>
<tr>
<td><strong>Soundness:</strong></td>
<td>1.0mm</td>
</tr>
<tr>
<td><strong>Comp. Strength:</strong></td>
<td></td>
</tr>
<tr>
<td>Mortar Prism:</td>
<td></td>
</tr>
<tr>
<td>1 day</td>
<td>26 - 29 MPa</td>
</tr>
<tr>
<td>3 day</td>
<td>38 - 45 MPa</td>
</tr>
<tr>
<td>7 day</td>
<td>51 - 58 MPa</td>
</tr>
<tr>
<td>28 day</td>
<td>62 - 70 MPa</td>
</tr>
</tbody>
</table>

**COMPATIBILITY**

Although Blue Circle® High Early Strength Cement is compatible with other AS 3972 cements and AS 3582 supplementary cementitious materials (Flyash, slag or amorphous silica), blending is not recommended as the strength gain characteristics may be affected.

Trials must be done to ascertain the suitability of Blue Circle® High Early Strength Cement blends with any other product.

**CONCRETE PROPERTIES**

The composition and the fineness of Blue Circle® High Early Strength Cement delivers faster strength gain when compared to coarser cements. Early strength depends on the water to cement ratio, types of admixtures used and the environmental factors such as the ambient temperature.
High Early Strength Cement

COLD WEATHER CONCRETING
The pre-hardening period during which concrete must be protected against frost may be reduced if Blue Circle® High Early Strength Cement is used, especially if higher cement content is used.

The following graph gives an indication of the rate of strength development of Blue Circle® High Early Strength Cement.

RATE OF STRENGTH DEVELOPMENT OF HIGH EARLY STRENGTH CEMENT

MIX DESIGN
Dense, fully compacted concrete of low permeability is essential to minimise the aggressive effects of sulphate and chloride attack. Careful selection of mix components is essential and reference should be made to AS 1379 – The Specification and Manufacture of Concrete and AS 3600 – Concrete Structures when selecting the required strength and cement levels appropriate for the required durability.

MIXING
AS 1379 gives requirements for material quality and mixing of ready-mixed concrete. Presence of salts and organic matter in aggregates and mixing water may affect concrete performance and relevant requirements of AS1379 must be observed.

PLACING
AS3600 gives requirements for handling, placing and finishing of concrete. Exposure classification usually determines both the quality of concrete and the depth of cover to reinforcement. Appropriate selection of the exposure classification is therefore critical.

CURING
A minimum curing period of 7 days or longer, depending on the exposure classification, is required and should begin as soon as practicable. Wet or moist curing is recommended, but other techniques may be suitable, including curing compounds to AS 3799 or polyethylene sheeting.

Concrete will benefit from curing in terms of reduction in shrinkage cracking potential, improved surface quality with respect to abrasion resistance, permeability to air and water, improved carbonation resistance.

AVAILABILITY
Blue Circle® High Early Strength Cement is available in bulk and in 20kg bags. Details on the price and availability of the product upon request by contacting the Sales Manager on the numbers listed.

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 ADDITION OF EXCESS WATER ON CONCRETE STRENGTH AND SLUMP

Other factors which affect the strength and durability of concrete containing Blue Circle® High Early Strength Cement are:

- The mix design, including admixtures.
- Temperature (ambient and materials).
- Air content.
- Compaction of concrete.
- Curing of concrete.
High Early Strength Cement

STORAGE

The “shelf life” of Blue Circle® High Early Strength Cement is dependent on the storage conditions, as contact with air and moisture will cause deterioration in cement performance. Cement bags are not waterproof and should be stored off the ground, in as dry a condition as possible. Cement storage silos must be kept in good repair, with no damp air or moisture ingress.

It is recommended that Blue Circle® High Early Strength Cement be retested if the age of cement exceeds three months.

SAFE HANDLING

This product contains cement chemicals and trace amounts of Hexavalent Chromium. Avoid generating dust. Use personal protection equipment against exposure and alkali burns. Wash product off unprotected skin immediately with water. The use of goggles, dust masks, barrier creams and rubber gloves is recommended.

For further safety information consult the Material Safety Data Sheet for the product.