

LOW HEAT CEMENT

PRODUCT DESCRIPTION

Cockburn Cement produces Low Heat Cement, Type LH conforming to Australian Standard AS 3972.

Low Heat Cement is a blended cement manufactured to exacting standards at our Kwinana Works in Kwinana, Western Australia, for use in the construction and building industry and in domestic applications.

SUPPLY

Low Heat Cement is available in bulk, bulk bags and 20 kg multi-walled paper bags from the Kwinana Works and the Customer Service Centres in regional areas. Paper bags are palletised and stretch wrapped.

SPECIFICATION

Low Heat Cement exceeds the minimum specification for Types LH, SR, and GB cement given in AS 3972. Low Heat Cement is manufactured under a third party certified manufacturing and supply quality assurance system to ISO 9001 (BSI Certification No FS 604665).

Low Heat Cement is produced using a carefully prepared blend of Type GP cement and ground granulated blast furnace slag complying with AS 3582.2.

APPLICATIONS

Low Heat Cement is ideal for use in mass-fill structural pours where there is a need to control the rate of internal concrete temperature rise (heat of hydration) in order to reduce the risk of thermal cracking.

As Low Heat Cement exceeds the requirements of Type SR cement, it can also be used in concretes and mortars where the possibility of attack by sulfate bearing waters and soils is high. For example, marine conditions, sewage treatment works, or where sulfates are in the soil (wherever salts occur naturally within the soil or as contamination from industrial wastes).

The sulfate attack of concrete is simplistically explained as a result of the reaction between free and mobile sulfates and cementitious alumina bearing compounds in the concrete (from the cement), to form a complex and expansive crystalline mineral. The mineral product of this reaction is characterised by crystal growth of greater volume than the original hydrated cement matrix. This expansive crystalline growth ultimately leads to internal stresses in the concrete structure and general weakening of the concrete.

Sulfate Resisting Cement has a low content of alumina bearing compounds. This minimises the material liable to sulfate attack and reduces the possibility of expansive products forming.

For Sulfate Resisting Cement, when used in concrete where sulfates will be present either within the soil or in sulfate bearing waters, minimum cement contents and maximum water cement ratios should be as recommended in the CCAA Technical Note 68 "Sulfate Resisting Concrete" and AS 3600.

Supplementary cementitious materials:

Low Heat Cement is compatible with Fly Ash, Amorphous Silica, and Ground Granulated Blast Furnace Slag conforming to the relevant sections of AS 3582.

Admixtures for concrete:

Low Heat Cement is compatible with concrete admixtures complying with AS 1478.

TYPICAL PROPERTIES

Low Heat Cement, containing slag, has enhanced workability and may set a little slower than Type GP cement. The ultimate strengths of the two cements are roughly equivalent.

Characteristics of Low Heat Cement compared to General Purpose Cement:

- Increased concrete bleed.
- Improved workability, compactability, flowability and plasticity.
- Extended setting times and slower initial strength development.
- More sensitive to poor curing practices.
- Lower heat of hydration.
- Better resistance to chemical attack (with adequate cement content).

HANDLING AND STORAGE

Transportation may be in bulk road or rail tankers or in paper bags. Low Heat Cement can be stored in concrete or steel silos and paper bags for up six months provided that protection against ingress of moisture is observed throughout the storage of the product.

LOW HEAT CEMENT

Typical Physical Properties

Test	Typical Values	AS 3972 Requirement
Fineness Index (m ² /kg) AS 2350.8	370 - 450	-
Setting Time (hr:min) AS 2350.4		
Initial	2:50	Min 0:45
Final	4:20	Max 10:00
Soundness (mm) AS 2350.5	< 3	Max 5
Peak Temperature Rise (°C) AS 2350.7	19 - 23	Max 23
Compressive Strength ISO-CEN mortar bars (MPa) AS 2350.11		
3 Day	12 - 20	-
7 Day	25 - 37	Min 20
28 Day	45 - 61	Min 35
Mortar Expansion due to Sulfate Exposure (microstrain) AS 2350.14		
16 weeks	100 - 450	Max 750*

Note:

* When testing the sulfate resistance of cement mortar the difference in sulfate expansion between tests in the same laboratory, under conditions of repeatability can be up to 150 microstrain. To satisfy the requirements of sulfate resistance no single test may exceed 750 microstrain after 16 weeks.

Typical Chemical Properties

Test	Units	Max AS 3972	Typical Values
Sulphur Trioxide	%	3.5	2.0
Loss on Ignition	%	-	0.9
Chloride	%	0.1	0.01
Equivalent Alkalis	%	-	0.50
Hexavalent Chromium	mg/kg	-	Trace
Crystalline Silica Components	%	-	Trace
Portland Clinker	%	-	25 - 50
Slag	%	-	50 - 75
Gypsum	%	-	2 - 5
Mineral Addition	%	-	up to 7.5

SAFETY INFORMATION

For safety information refer to the Safety Data Sheet for Low Heat Cement.

CONTACT POINTS

For further information contact the Sales and Marketing Department at:

Cockburn Cement Ltd
 ABN 50 008 673 470
 Lot 242 Russell Road East
 Munster WA 6166
Telephone: 08 9411 1111

Email: sales@cockburncement.com.au
Web Site: www.cockburncement.com.au

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