

# Hydrated Lime

## PRODUCT DATA SHEET

BORAL

**Boral Cement** is a manufacturer and supplier of high quality hydrated lime. Product purity and surface area facilitate its chemical reactivity and settling rate. Boral Cement's commitment to quality ensures that these highly desirable characteristics are consistently produced providing users with a low residue, quality material which meets their requirements.

### HYDRATED LIME USES

Manufactured for the stabilisation of road surfaces.

Used as a filler in asphalt to improve resistance to high temperature rutting.

Supplied to the water treatment industry for softening, pH adjustment/ coagulation and removal of impurities.

Removal of acidic gases that are harmful to the environment particularly sulphur dioxide and hydrogen chloride from flue gas.

**Boral Cement Hydrated Lime** is manufactured and tested to AS1672/1997. A typical analysis is listed below:

Constituents		% Dry
Calcium Oxide	CaO	71.5%
Magnesium Oxide	MgO	0.9%
Iron Oxide	Fe <sub>2</sub> O <sub>3</sub>	0.7%
Aluminium Oxide	Al <sub>2</sub> O <sub>3</sub>	0.7%
Silicon Dioxide	SiO <sub>2</sub>	1.7%

Typical chemical composition (as Oxide)

Available Lime Index (as Ca[OH]<sub>2</sub>) 87%

Loss on Ignition 24 - 25%

Residue 75µm (200 mesh) 4%

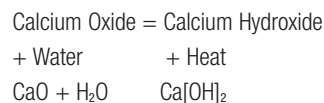
Specific Gravity: 2.0 - 2.3

Bulk Density: 400 - 500kg/m<sup>3</sup>

**Boral Cement** operates a Quality Assurance System meeting the requirements of ISO 9001. Lime quality verification is provided by the issue of NATA certificates generated at our Berrima Laboratory.

### CHEMICAL COMPOSITION

Generally **Hydrated Lime** is the hydrated oxide of calcium – Hydrated lime Ca[OH]<sub>2</sub>. When water is added to the quicklime, it hydrates, (slakes) to form calcium hydroxide (hydrated lime)



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### HYDRATED LIME MANUFACTURE

**Quicklime** can be readily slaked by adding water. However producing a dry powdered hydrated lime requires considerable expertise and sophisticated equipment. In Boral Cement's process quicklime is mixed with water at a closely controlled rate, sufficient to satisfy completely the affinity of the quicklime for water, but only enough to produce a dry powder. This dry powder is hydrated lime.

### PHYSICAL/CHEMICAL TESTS FOR LIME

The Australian Standard covering lime manufacture and testing methods is "AS 1672-1997 – Building Limes". This specification lays down the main physical and chemical requirements for high calcium and hydrated lime.

Physically, a high calcium hydrated lime like Boral Cement's must meet tests for: **Fineness**: specifies maximum sieve residues.

**Soundness**: shows the effectiveness of hydration.

For chemical requirements there is a minimum limit for available lime and maximum limits for magnesium and carbon dioxide.

The magnesia content, and impurities like silica, alumina, and iron are a function of the limestone from which the lime is made. Boral Cement's limestone deposit at Marulan South is of extremely high quality. Variations in the slight impurities are minimised by stockpiling and blending the raw material.

The Available Lime Index (ALI) shows how much lime is available for reaction. This index is vital to customers, as it shows how much of the lime received is useful to you. Available lime is always less than the total lime. Total lime includes lime combined as carbonate, silicate and other forms not available for chemical combination.

#### pH Solution of Lime @ 25°C:

CaO g/L	pH
0.064	11.27
0.065	11.28
0.122	11.54
0.164	11.66
0.271	11.89
0.462	12.10
0.680	12.29
0.710	12.31
0.975	12.44
1.027	12.47
1.160	12.53

### PACKAGING & DELIVERY

**Hydrated Lime** is available in bulk, delivered in typical 20-22 tonne loads by pneumatic tanker. Bulk pneumatic tankers that are capable of elevating product into a silo are used to transport **Hydrated Lime**. These vehicles are capable of discharging large amounts of product in a relatively short period of time. For such deliveries, the silo should be fitted with a properly designed filter or dust collector capable of handling the large volumes of air blown during discharge.

**Hydrated Lime** may also be packaged into bulk bags, to suit varied customer requirements. Bulk bags are generally delivered on flat top vehicles.

### BULK STORAGE – DESIGN CONSIDERATIONS

Storage facilities must be watertight to avoid product deterioration. As lime is non-corrosive to steel or concrete, these materials may be used to fabricate lime silos or hoppers.

Special care and thorough investigation are necessary before final selection of a storage design.

The two major problems are bin "hang-up" and "flooding" of the discharge opening.

Flow ability is enhanced when the internal surfaces of the silo are as smooth as possible. Projections such as bolt heads and welding ridges can resist material flow. The cone section of the silo or hopper should have a minimum slope of 60 degrees from the horizontal, with 70 degrees being desirable for **Hydrated Lime**. Air pads are also recommended for **Hydrated Lime**, starting half a metre (up) and running through to 1.5 metres above the silo outlet. They should be connected to a source of aeration, reducing bridging. Vibrators can be installed in **Hydrated Lime storage bins but can exacerbate "hang-ups" and bridging" when operated incorrectly.**

Hydrated Lime	
Solubility (20°C)	1.65 g/L
(30°C)	1.53 g/L
Angle of Repose – Fines	15-80°
Melting Point	2570°C
Slurry Density	g/l Ca[OH] <sub>2</sub>
S.G. 1.00	0
S.G. 1.08	130
S.G. 1.16	270
S.G. 1.23	390

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### NEUTRALISING ABILITY (NOMINAL)

1.32 kg Hydrated Lime = 1.00kg Quicklime.

### NEUTRALISING ABILITY (TYPICAL PRODUCT)

1.26 kg Hydrated Lime = 1.00kg Quicklime.

Lime DISSOLVES aluminium and lead and ATTACKS brass.

**Boral Cement Hydrated Lime** should be tested before use if the age of the product exceeds 3 months.

### SAFETY CONSIDERATIONS

Problems in handling lime will not develop if some simple precautions are taken.

Prolonged exposure to hydrated lime may cause drying and chapping of sensitive skin. Where dust may be encountered (in emptying bags or in working in a lime handling plant), workers should wear snugly fitting safety goggles with side shields and a lightweight filter mask. Use of a protective cream on exposed parts of the body is advisable. The greatest risk of serious injury when it comes to lime is when it comes in contact with the eyes. Special attention must be paid to eye protection and flushing facilities should be readily available to clear lime from eyes should contact occur.

For further details please contact the Lime Department for a Material Safety Data Sheet on **02 9033 4000** or visit the Boral Cement website.

### 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.

The information in this Data Sheet and any advice given should be viewed as a guide only. Boral makes no guarantee of the accuracy or completeness of the information and recommends you conduct your own testing to determine suitability for your specific purpose.

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