

## Cementaid – 3CC™

### Overview

Hydrophobic and pore-blocking cement additive to create a waterproof (non-absorptive), corrosion-proof, impermeable structural concrete. No membranes are required or need to be used. Suitable for severe environments: including saltwater, acid sulphate and corrosive conditions.



### Product Description

In waterproofing industry, the traditional approach has been to apply external membrane or surface treatments to the concrete as external barriers so as to prevent ingress of water, which have only a temporary life span and required periodic replacement or maintenance. The consequences of this, is that more conventional, typically damaging products are being used.

Cementaid HPI / Cementaid Hydrophobic Poreblocking Ingredient (HPI) is an ingredient that achieves waterproof and membrane-free structural concrete using alternative means. When dosed into concrete during batching, once hardened, it blocks interstitial pores and works as a “permanent” waterproofing system to basement structures as well as podiums and roofs in buildings. Since it makes concrete non-absorptive, it enhances concrete life span i.e. durability.

Cementaid has three HPI products: Everdure Caltite System, 3CC and Cementaid Aquapel. The raw mixtures of each of these products are (with the exception of Everdure Caltite) effectively the same. The major difference between them is the amount of active chemicals in the admixture; the mix-ratio between the cement and the amount of the added HPI. The Everdure Caltite System has the most active chemicals (which makes this product more hydrophobic when compared with the rest of the product range), followed by 3CC and Cementaid Aquapel. The Everdure Caltite System is blended with polymer binders not shared by the others.

3CC™ is the second most heavy duty product in the Cementaid range for integral waterproofing, damp-proofing and corrosion proofing of structural concrete, renders, toppings, etc. 3CC™ is suitable for use in all concrete structures subject to severe damp/wet conditions without application of separate membranes or tanking. It enhances durability in salt, acid or other aggressive service environments.

### PRODUCT SPECIFICATIONS

<b>Options</b>	In bulk tank (plastic)
<b>Colours</b>	Liquid: dark brown Powder: gray
<b>Warranty</b>	10 years warranty
<b>Expected Life</b>	Residential & Commercial: same life span as per the concrete structure
<b>Indicative Costs</b>	Cost of supply & installation: depends on country
<b>Purchase Options</b>	Credit term / COD



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<b>Constituents</b>	<p>Caltite  Weight: 15% w/w (as solid content)  Actual weight: 2g/m<sup>3</sup>  Post-Consumer Recycled Content: Nil  Post-Industrial Recycled Content: ca. 5%</p>
<b>Technical Specifications</b>	<p>All concrete (specify areas) to be produced by an approved supplier and constructed in accordance with the Main Specification and drawings and strictly in accordance with current Cementaid Everdure Caltite System Detailed Technical Specifications, using only Cementaid added ingredients and concrete containing not less than 350kgs of cement per cubic metre, and having a W:C ratio not in excess of 0.45, in conjunction with structural reinforcement of hard rib deformed bar and top steel reinforcement grid and other details conforming to current recommendations and requirements of Cementaid. Regular or intermittent Absorption testing of production concrete may be required by the Engineer.</p> <p>Suggested mix-ratio HPI on 1kg cement:</p> <ul style="list-style-type: none"> <li>• Everdure Caltite System: 100ml HPI (extra heavy duty)</li> <li>• 3CC: 50ml HPI (heavy duty)</li> <li>• Cementaid Aquapel: 37.5ml HPI</li> </ul>
<b>National / International Standards</b>	ISO 9000, individual country environmental and factory act
<b>Country of Origin</b>	Australia
<b>Projects</b>	As below in overview chart.
<b>Preparation</b>	Add admixture to cement mix before pouring.



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Project	Completion Year	Developer / Architect / Engineer / Contractor	Location used
Suntec City	1993	<ul style="list-style-type: none"> <li>• Suntec City</li> <li>• DPA</li> <li>• Maunsell</li> <li>• Nishimatsu / Hyundai-SsangYang</li> </ul>	<ul style="list-style-type: none"> <li>○ 90,000m<sup>2</sup> basement slab (2-levels).</li> <li>○ Suspended swimming pool over retails</li> </ul>
Parc Oasis at Jurong	1995	<ul style="list-style-type: none"> <li>• Everbuilt Development</li> <li>• RSP Arch</li> <li>• RSP Engineers</li> <li>• SsangYong</li> </ul>	<ul style="list-style-type: none"> <li>○ The whole basement wall and slab (1-level).</li> <li>○ Landscaping deck over entire basement.</li> </ul>
Singapore Recreation Club	1996	<ul style="list-style-type: none"> <li>• SRC</li> <li>• Archurban Architect</li> <li>• KTP</li> <li>• Hexacon</li> </ul>	<ul style="list-style-type: none"> <li>○ Diaphragm Wall to basement. (4-levels)</li> <li>○ Basement slab.</li> </ul>
Automobile Mega Mall	1999	<ul style="list-style-type: none"> <li>• Singapore Used Car Assoc</li> <li>• Edmond Choo &amp; Assoc</li> <li>• SBT &amp; Assoc</li> <li>• Evergreat</li> </ul>	<ul style="list-style-type: none"> <li>○ 10,000m<sup>2</sup> roof slab over office. (post tensioning)</li> </ul>
Structural repair to beams and pilecaps underneath Tanjong Pagar Terminal.	2001	<ul style="list-style-type: none"> <li>• PSA</li> <li>• -</li> <li>• Spec Consultants</li> <li>• L&amp;M</li> </ul>	<ul style="list-style-type: none"> <li>○ Salvage severe spalled off beams and pile caps by "jacketing" through waterproofing grout.</li> </ul>
MRT C707 Dhoby Ghaut Station	2002	<ul style="list-style-type: none"> <li>• LTA</li> <li>• LTA</li> <li>• LTA</li> <li>• Obayashi Corporation</li> </ul>	<ul style="list-style-type: none"> <li>○ Stamford canal and roof over station.</li> <li>○ Entire basement slab (5-levels)</li> </ul>
Singapore Management Uni	2005	<ul style="list-style-type: none"> <li>• Singapore Management Uni</li> <li>• KNTA</li> <li>• Maunsell</li> <li>• Obayashi Corporation</li> </ul>	<ul style="list-style-type: none"> <li>○ Entire basement. (2-levels)</li> <li>○ All podiums over car park, office and canteen.</li> </ul>
Condomium at Jalan Taman	2005	<ul style="list-style-type: none"> <li>• Hoi Hup Realty</li> <li>• JGP</li> <li>• TH Chuan</li> <li>• Straits Construction</li> </ul>	<ul style="list-style-type: none"> <li>○ Entire basement. (2-levels)</li> <li>○ Suspended swimming pool to link two towers at 9-storey.</li> </ul>
MRT C828 Cut and Cover Tunnel between Boulevard / Stadium Station	2008	<ul style="list-style-type: none"> <li>• LTA</li> <li>• LTA</li> <li>• LTA</li> <li>• Nishimatsu – Lum Chang JV</li> </ul>	<ul style="list-style-type: none"> <li>○ Entire tunnel box.</li> </ul>
Resorts World Sentosa	2010	<ul style="list-style-type: none"> <li>• Genting</li> <li>• DPA</li> <li>• Aecom</li> <li>• Sembawang / Kajima-Tiong Seng JV / Low Keng Huat / China Jingye</li> </ul>	<ul style="list-style-type: none"> <li>○ Entire 150,000m<sup>2</sup> basement. (2-levels)</li> <li>○ Suspended lagoon.</li> <li>○ All suspended swimming pools in hotels</li> </ul>



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## ECOSPECIFIER LIFE-CYCLE ASSESSMENT

### INTEGRATED DESIGN AND POLICY ISSUES

By making use of an admixture in the cement to create a waterproof, corrosion-proof concrete material, the need for addition of a traditional waterproof membrane is eliminated. This eliminates “waterproofing” as a design task and removes a complete installation labour sub-contract from the construction phase. The use of this product creates time savings, improves worker safety and reduces costs. Additionally, the risks of leaks occurring in a traditional membrane is much higher than with this admixture, where the concrete itself becomes waterproof and so creates a hard natural protective waterproof integrated element.

### HUMAN HEALTH

#### Health

Not applicable, component within concrete.

When mixed with cement and water, material releases ammonia. The content of ammonia is low is not considered a health hazard under good working conditions, however continuous long term working in confined and poorly ventilated areas may cause irritation response, sore eyes/nose. Prolonged or repeated skin contact may cause drying with cracking, irritation and possible dermatitis following.

#### Comfort

Not applicable, component within concrete

#### Indoor Environment Quality

The VOC content of unadmixed Cementaid HPI liquids (like Everdure Caltite System, 3CC and Cementaid Aquapel) is <4.5g/l. When admixed in concrete, the VOC levels from these HPI's are <0.3g/l. California South Coast Air Quality Management District Rule 1168 c(2) as specified by Green Star defines the requirements for this product as 250g/l which is described in the Green Star Technical Manual under 'Architectural Sealant' (includes sealants used to enhance water-proofing properties). Cementaid HPI's Everdure Caltite System, 3CC and Cementaid Aquapel comply with Green Star requirements.

#### Electromagnetic Radiation

Not Applicable

#### Safety

Chemical Hazard Rating:

- Flammability: Nil
- Toxicity: Nil
- Body Contact: Moderate
- Reactivity: Low
- Chronic: Moderate

#### Accessibility

Not Applicable



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## ECOLOGICAL QUALITY

### Terrestrial Pollution

*Emissions* – Product may have limited emissions in the production of ammonium hydroxide. However, product increases the durability of concrete, thereby lowering the demand for new concrete and reducing emissions from the manufacturing of virgin materials.

*Physical* – Product provides lifetime waterproofing and therefore reduces waste to landfills compared to assessment comparisons, such as latex membranes, which have limited lifetimes and often have to be removed and dumped in landfill before new membrane can be applied.

### Aquatic Pollution

*Emissions* – No known emissions to aquatic ecosystems.

*Physical* – Very toxic to aquatic organisms in liquid form prior to adding to concrete.

### Atmosphere Pollution

*Greenhouse (GHG)* – Information is not available.

*Greenhouse intensity* – Information is not available

Table below provides land transportation greenhouse intensity figures to help calculate the greenhouse gas intensity of land transportation from shipping port.

Light commercial vehicle	Rigid Truck	Articulated Truck
0.001451kgCO <sub>2e</sub> / kg.km	0.000195kgCO <sub>2e</sub> / kg.km	0.000169kgCO <sub>2e</sub> / kg.km

Transport intensity figures sourced from Australian National Greenhouse Gas Inventory 1990, 1995 and 1999 and WWF International, Inland Navigations and Emissions, 2005.

*Operational efficiency* – Not Applicable

*Re-use Efficiency* – Not Applicable

*Toxics and Pollutants* – Product is non toxic to humans, but should not be allowed to enter marine or aquatic environments.

*Ozone Depletion* – Not Applicable

*Urban Heat Island Effects* – Not Applicable

*Noise* – Not Applicable

### Biodiversity

Product has limited impact on biodiversity from production of ammonium hydroxide. However, product improves durability of concrete and structures, therefore reducing need for replacement of materials that have high biodiversity impacts. Spills released into surface water are potentially harmful to aquatic life.



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## RESOURCE DEPLETION

### Resource Efficiency

By making use of Cementaid HPI System, there is no longer need to make use of additional traditional external membranes to seal the construction against water and corrosion. This leads to a saving on material-use like EPDM and/or other sealing materials. These traditional methods have temporal life span and require periodic replacement or maintenance. The reduction in material use and fossil fuel consumption as a result of the durability and extension of end-products lifespan, provides a positive offset against minor resource consumption in manufacture of this product.

### Embodied Fossil Fuel Energy

Information unavailable

### Embodied Water

In normal 30 litres dosage, 23.5 litres is liquid. (i.e. approx. 78.3%.)

### Durability

Once product is applied into concrete, the performance is the same as the lifespan of the concrete itself. No periodical replacement is required.

### Reusability

Product is not re-usable.

### Repairability

Not Applicable

### Design for Dematerialisation

Not Applicable

### Design for Disassembly

Not Applicable

### Recyclability

Manufacturer does not recycle the product.

Product contained in plastic Bulk Tank, possibility for recycled packaging.

After its application into concrete mix, the cured concrete can be used as recycled aggregate in future.

### Maintenance

Not Applicable

### Product Takeback Scheme

Not Applicable



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### **Extended Producer Responsibility (EPR)**

Not Applicable

## **CORPORATE AND SOCIAL SUSTAINABILITY**

### **Audits and Environmental Reporting**

Waste treatment has to comply with local National Environmental Agency policy.

### **Convictions**

No

### **Environmental Policy**

No

### **Social Enhancement Programs**

No

### **Technology Transfer Programs**

No

### **Environmental Management Systems (EMS)**

The company uses its own EMS system.

Not currently compliant with ISO14001.

## **ECOSPECIFIER ISSUES OF CONCERN / RED LIGHTS**

### **Issues of Concern**

Red light comment: Product is unlikely to cause a risk due the low release of ammonia. It is not considered a health hazard under good working conditions. Proper ventilation and protective clothing avoid possible irritation to eyes/nose and skin.

According to Australian Centre for Occupational Health & Safety (ACOHS) guidelines, HPI's are considered non-hazardous. Workplace exposure time-limitations and good ventilation are suggested to apply. Concrete modified with CEMENTAID Hydrophobic Pore-blocking Ingredients liberates ammonia fumes during mixing & placing operations. The ammonia smell vanishes after the concrete reaches a hardened state, but can sometimes be detected during form-stripping operations. This residual odor dissipates rapidly under ventilated conditions.



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**ECOSPECIFIER GREENRATE GREEN BUILDING SCHEME PRE-ASSESSMENT**  
**ESTIDAMA Pearls Design System for New Buildings**

<p><u>SM-6: Design for Durability</u></p> <p>Product may assist in a project obtaining this credit by minimising building impacts from condensation, water ingress, improper drainage and physically protecting vulnerable areas of the building envelope and surroundings. Credit point is awarded where a Building Durability Plan has been implemented to optimise the integrity of the building's internal and external envelope and can achieve the projected life with low maintenance.</p>	<p><i>Points Available</i></p> <p>1</p>
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**This product has no related credits in the following tools:**

- Green Star™ (see disclaimer below)
- Green Star SA™ (see disclaimer below)
- LEED®
- BREEAM™
- BCA Green Mark
- Green Building Index
- National Australian Built Environment Rating System (NABERS)
- BASIX Building Sustainability

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**ASSESSMENT COMPARISON**

Cement additives and waterproof sealants

**RELATED TOPICS**

Cement replacements / enhancers, waterproofing, admixtures, sealants

**CSI CATEGORY & NUMBER**

07 16 00 Cementitious and Reactive Waterproofing

07 16 16 Crystalline Waterproofing

**NBS CATEGORY & NUMBER**

**Building and Residential Services**

E05 In situ concrete construction generally

E10 Mixing/ Casting/ Curing in situ concrete

J10 Cementitious mortar tanking/ damp proofing

Z20 Fixings and adhesives

Z22 Sealants

**Commercial Engineering & Services**

None

**Landscaping**

E10 Mixing/ Casting/ Curing in situ concrete



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J10 Cementitious mortar tanking/ damp proofing  
 Q10 Stone/ concrete/ brick kerbs/ edgings/ channels  
 Q21 In situ concrete roads/ pavings/ bases  
 Z20 Fixings/ Adhesives  
 Z22 Sealants

**ASSESSMENT CRITERIA SATISFIED**

<b>ENERGY/GREENHOUSE</b>
<ul style="list-style-type: none"> <li>• Low energy in production</li> </ul>
<b>HABITAT &amp; LAND</b>
<ul style="list-style-type: none"> <li>• Reduced aquatic impact</li> </ul>
<b>RESOURCE DEPLETION &amp; EFFICIENCY</b>
<ul style="list-style-type: none"> <li>• Reduced Material Use</li> </ul>
<b>REDUCES POLLUTION</b>
<ul style="list-style-type: none"> <li>• Reduced Life Cycle Toxicity</li> <li>• Reduced Life Cycle Carcinogen</li> <li>• Reduced Smog: Reduction</li> </ul>
<b>OTHER VITAL SIGNS</b>
<ul style="list-style-type: none"> <li>• National / International Standard</li> <li>• MSDS</li> <li>• Documented Manufacturer Claim</li> </ul>



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## MANUFACTURER DETAILS

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