

Cementaid – Cementaid HPI™

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.

PRODUCT SPECIFICATIONS

Options	In bulk tank (plastic)
Colours	Liquid: dark brown Powder: gray
Warranty	10 years warranty
Expected Life	Residential & Commercial: same life span as per the concrete structure
Indicative Costs	Cost of supply & installation: depends on country
Purchase Options	Credit term / COD
Constituents	Caltite Weight: 15% w/w (as solid content) Actual weight: 2g/m ³ Post-Consumer Recycled Content: Nil Post-Industrial Recycled Content: ca. 5%



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Technical Specifications	<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"> • Everdure Caltite System: 100ml HPI (extra heavy duty) • 3CC: 50ml HPI (heavy duty) • Cementaid Aquapel: 37.5ml HPI
National / International Standards	<p>ISO 9000, individual country environmental and factory act</p>
Country of Origin	<p>Australia</p>
Projects	<p>As below in overview chart.</p>
Preparation	<p>Add admixture to cement mix before pouring.</p>



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Project	Completion Year	Developer / Architect / Engineer / Contractor	Location used
Suntec City	1993	<ul style="list-style-type: none"> • Suntec City • DPA • Maunsell • Nishimatsu / Hyundai-SsangYang 	<ul style="list-style-type: none"> ○ 90,000m² basement slab (2-levels). ○ Suspended swimming pool over retails
Parc Oasis at Jurong	1995	<ul style="list-style-type: none"> • Everbuilt Development • RSP Arch • RSP Engineers • SsangYong 	<ul style="list-style-type: none"> ○ The whole basement wall and slab (1-level). ○ Landscaping deck over entire basement.
Singapore Recreation Club	1996	<ul style="list-style-type: none"> • SRC • Archurban Architect • KTP • Hexacon 	<ul style="list-style-type: none"> ○ Diaphragm Wall to basement. (4-levels) ○ Basement slab.
Automobile Mega Mall	1999	<ul style="list-style-type: none"> • Singapore Used Car Assoc • Edmond Choo & Assoc • SBT & Assoc • Evergreat 	<ul style="list-style-type: none"> ○ 10,000m² roof slab over office. (post tensioning)
Structural repair to beams and pilecaps underneath Tanjong Pagar Terminal.	2001	<ul style="list-style-type: none"> • PSA • - • Spec Consultants • L&M 	<ul style="list-style-type: none"> ○ Salvage severe spalled off beams and pile caps by "jacketing" through waterproofing grout.
MRT C707 Dhoby Ghaut Station	2002	<ul style="list-style-type: none"> • LTA • LTA • LTA • Obayashi Corporation 	<ul style="list-style-type: none"> ○ Stamford canal and roof over station. ○ Entire basement slab (5-levels)
Singapore Management Uni	2005	<ul style="list-style-type: none"> • Singapore Management Uni • KNTA • Maunsell • Obayashi Corporation 	<ul style="list-style-type: none"> ○ Entire basement. (2-levels) ○ All podiums over car park, office and canteen.
Condomium at Jalan Taman	2005	<ul style="list-style-type: none"> • Hoi Hup Realty • JGP • TH Chuan • Straits Construction 	<ul style="list-style-type: none"> ○ Entire basement. (2-levels) ○ Suspended swimming pool to link two towers at 9-storey.
MRT C828 Cut and Cover Tunnel between Boulevard / Stadium Station	2008	<ul style="list-style-type: none"> • LTA • LTA • LTA • Nishimatsu – Lum Chang JV 	<ul style="list-style-type: none"> ○ Entire tunnel box.
Resorts World Sentosa	2010	<ul style="list-style-type: none"> • Genting • DPA • Aecom • Sembawang / Kajima-Tiong Seng JV / Low Keng Huat / China Jingye 	<ul style="list-style-type: none"> ○ Entire 150,000m² basement. (2-levels) ○ Suspended lagoon. ○ All suspended swimming pools in hotels



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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 _{2e} / kg.km	0.000195kgCO _{2e} / kg.km	0.000169kgCO _{2e} / 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

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



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MANUFACTURER DETAILS

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