



THE PHILOSOPHY OF VERSATILE HOSPITAL DESIGN:

WALL & CEILING
SOLUTIONS

INTRODUCTION

The unique requirements of hospitals and healthcare design require special consideration in regards to design and the products specified. In respect to the internal walls and ceilings of these structures, provisions for fire resistance, impact resistance, moisture control and acoustic control should be made. The BCA classifies hospitals as Class 9a building, and contains Deemed-to-Satisfy Provisions applicable for this type of construction.

In addition to these performance factors, the minimisation of downtime in the installation and ongoing maintenance of these products is also crucial.

Specifying a solution that meets all of these requirements is a necessity not only for the day-to-day operation of the facility, but also for maintaining the reputation of the Architect, specifier or installer involved.

Here we look at key considerations that should be made in the design and specification of products for modern Australian hospitals and healthcare facilities.





INFECTION CONTROL

Effective infection control in hospitals and health care facilities is vital to prevent the spread of microorganisms between patients, staff and visitors. The internal walls and ceilings used play a significant role in good design for effective infection control.

There is the potential for the walls and ceilings of healthcare facilities to become moist, sticky or damaged which can result in pathogenic microorganisms sticking to them. In addition, surfaces that are porous or textured may be difficult to clean and might therefore harbor potentially pathogenic microbes.

To minimise the occurrence of moisture, The Australasian Health Facility Guidelines states that wall surfaces should be smooth and easily cleaned, avoiding joined laminated and textured surfaces. Walls to wet areas should have a water resistant finish with no gaps and the ceiling should be water resistant.

MINIMISING DOWNTIME – INSTALLATION AND MAINTENANCE

Hospitals operate around the clock and having an extended period of downtime is not an option. Internal walls and ceilings used in corridors and common rooms as well as specialist rooms must provide easy repair and maintenance to minimise interruptions to operation. BCA Deemed-to-Satisfy provisions require the surface finish of all floors and walls within a Class 9a building must have a smooth impervious and non-toxic finish. In addition the junctions between floors and walls must be covered for ease of cleaning¹.

As hospital walls, particularly the hospital corridors are susceptible to knocks from trolleys and hospital beds, impact damage to wall surfaces can incur significant downtime for repairs as well as maintenance costs over the lifetime of a hospital. Internal walls should provide impact resistance to both soft body impact (eg. Someone falling against or putting pressure against a wall) and hard body impact (eg. Direct impact damage from trolleys).

“ Impact damage to wall surfaces can incur significant downtime for repairs as well as maintenance costs ”



FIRE PROTECTION

The BCA contains Deemed-to-Satisfy Provisions for the internal walls of Class 9a buildings. Various walls must meet or exceed the required Fire Resistance Level (FRL). The three fire test failure criteria for the FRL are set out in Australian Standards and expressed in minutes as structural adequacy, integrity and insulation.

The following table BCA fire requirements for hospitals:

Compartment fire wall	120/120/120 or -/120/120
Ward area fire wall	60/60/60 or -/60/60
Ward area smoke wall	-/-/-
Public corridors and lobbies	120/-/- or -/-/-

Building Code of Australia – Class 2 to Class 9 Buildings 2015

ACOUSTICS

Sounds levels in hospitals have increased over the past 50 years and now exceed World Health Organisation recommendations for community noise³. The body responds to noise in the same way it responds to stress. In an already stressful hospital environment, this can have a severely negative impact on patient recovery and staff wellbeing⁴.

While there are not specific BCA provisions for sound insulation in hospitals, considerations should be made for potential noise transfer within the building as well as noise entering through external walls and windows to assist in minimising disruption and stress for patients and staff.



FIBEROCK® AQUA TOUGH™ BY USG BORAL

With the design and installation convenience of plasterboard, USG Boral FIBEROCK® Aqua Tough™ provides a versatile, lightweight solution for interior wall linings and ceilings in hospitals and healthcare applications.

FIBEROCK® addresses the key considerations for healthcare design; including:

Minimise downtime: Suitable for interior lining in wet and dry areas, with the same build-ability in both areas. Using one product allows for single delivery and less handling, resulting in a simplified installation and reduced downtime.

Improved infection control: Moisture and mould resistant, provides a smooth and seamless surface finish that is easy to clean and disinfect.

High-traffic, high-impact hospital environments: Exceptional impact resistance – at least as strong as 9mm fibre cement.

Fire protection: Two way fire rated wall systems up to 60 minutes (single layer) and 120 minutes (two layers) that satisfy BCA requirements for fire protection within hospitals and other Class 9a buildings.

Acoustic performance: High-mass for superior noise control that provides sound isolation for privacy or comfort and helps to reduce sound transmission in noisy areas.

Attachment of Fixtures: FIBEROCK® Aqua Tough™ provides an excellent

foundation material for attaching a wide range of fixtures to the wall. It often eliminates the need for additional nogs or back blocking for attaching many fixtures and only seldom requires pre-drilling when attaching the fastener.

USG Boral FIBEROCK® Aqua Tough™ assists Architects in reducing the complexity of specifying for hospitals, with a high-performance, BCA compliant product that eliminates downtime and looks great.

For hospital applications where high acoustic performance is required in addition to impact resistance and hygiene standards, USG Boral Mars Healthcare Acoustical Ceiling Tiles provide the perfect solution. USG Boral Mars Acoustical Ceiling Tiles feature a water-repellent membrane designed for durability and safety with common disinfectants, and a washable and soil-resistant finish that is also impact and scratch resistant.

For a full healthcare acoustic ceiling solution, Mars Healthcare ClimaPlus acoustic ceiling tiles can be installed with the DONN® DX Suspension System with high-performance Healthcare Coating providing an economic, simple and versatile total system.

As a further guide for designers and builders of healthcare facilities, included on page B8 of USG Boral Systems+ Catalogue are acoustic rating recommendations contained in UK Health Technical Memorandum HTM 08-01: Acoustics.

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CASE STUDY 1: GOLD COAST UNIVERSITY HOSPITAL (GCUH)

The \$1.76 billion Gold Coast University Hospital is one of the largest public health infrastructure projects in Australia. The hospital is a vital component in the Queensland Government's vision to deliver state-of-the-art health facilities and services that cater for population growth in South East Queensland.

USG Boral FIBEROCK® Aqua Tough™ was specified for use in the walls and ceilings providing a full system solution across both wet and dry areas, assisting in the project being delivered on-time and within budget.

Project Manager, Paul Langhorne of Lend Lease commented on the use of FIBEROCK® Aqua Tough™ in the project:

“It is a superior product due to the nature of the composite board, it is easy to work with, it does not crack unlike fibre cement products and when impacted does not get holes unlike plasterboard products, this means that there are no areas for micros such as superbugs to reside... it also means that we do not have to keep going back in to repair holes and cracks, saving considerable time and money in after-build-costs.

For any medical buildings the first thing I would say is – use FIBEROCK® Aqua Tough™.”⁵

CASE STUDY 2: SOUTH AUSTRALIAN HEALTH AND MEDICAL RESEARCH INSTITUTE

The \$200 million SAHMRI in Adelaide has won multiple awards for its innovative design, combining a unique aesthetic with environmental sustainability initiatives.

Instead of using a variety of lining and board products and all the complexity that entails, USG Boral FIBEROCK® Aqua Tough™ was used throughout the 30,000 square metre facility including labs, research areas and offices. USG Boral staff worked closely with the ceiling and wall contractors to ensure the project ran on time and to plan.

“Using one-multi-purpose board substantially streamlined the fit-out process.” (Peter Wood, National Architectural Specifications Manager, USG Boral.)⁶

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USG BORAL AUSTRALIA

In early 2014, Boral Plasterboard came together with USG to form a 50/50 joint venture known as USG Boral. With around 3,500 employees, USG Boral is a leading manufacturer and supplier of plasterboard-based wall and ceiling lining systems and accessories in Australia, Asia and the Middle East.

To find out more about USG Boral building solutions for hospitals and healthcare click [here](#).

<http://www.usgboral.com/healthcare>



Case Studies 1 and 2 are based on information provided by Lend Lease/Gold Coast University Hospital and/or South Australian Health and Medical Research Institute. USG Boral does not guarantee comparable results elsewhere.

REFERENCES

- ¹ Building Code of Australia – Class 2 to Class 9 Buildings 2015
- ² <https://law.resource.org/pub/au/ibr/as.1530.4.2005.pdf>
- ³ https://www.nursesfornurses.com.au/admin/uploads/Noise_in_the_ICU.28.pdf
- ⁴ http://hiaconnect.edu.au/old/files/Hospital_Design_Review.pdf
- ⁵ http://www.usgboral.com/content/usgcom/en_australia/inspiration-center/project-gallery/gold-coast-university-hospital-gcu.html
- ⁶ http://www.usgboral.com/content/usgcom/en_australia/inspiration-center/project-gallery/south-australian-health-medical-research-institute-sahmri.html

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