AceWall™

Injection-Moulded Full-Height Wall Panels

A development of AceWall International Pty Ltd
Adelaide, South Australia

AceWall™

AceWall™ is a fibre-reinforced, water-resistant, gypsum-based, non-load-bearing wall panel, designed for external and internal applications within modern residential, commercial and industrial low-rise and high-rise developments. The product is set to revolutionize the construction industry due to its low product and installation cost, rapid installation, high strength-to-weight ratio, advanced sound/thermal/fire performance and strong eco-friendly characteristics.

Advantages

- Product:
  - Light Weight
  - Low Cost
  - Rapid Installation
  - High Quality Finish (smooth, flat, crack-free)
  - High Resistance (thermal, sound, fire, earthquake, termite, water)
  - Low Carbon Footprint (low embodied energy, abundant natural materiels)
  - Recyclable (re-calcination)

- Factory:
  - High capacity (one panel per minute)
  - High energy and materiel efficiency
  - Advanced computerized, automated operation
  - Modular (expandable, re-locatable close to major development sites)
  - Eco-friendly

Materiels

- Gypsum *
- Water
- Fibre-glass (short fibre)
- Waterproofing Agent
- Activator
- Optional Infill (e.g. concrete, perlite)

* Can be obtained by calcination of industrial waste materiel such as “flue gas” or “phospho” gypsum

AceWall™ Panels

- Pre-fabricated non load-bearing
- Hollow section (filled or unfilled options)
- Precision molded construction
- Fibre-reinforced water-resistant gypsum
- Advanced perlite infill option
- Dimensions
  - Height - 2.1 m to 3.6 m
  - Width - 60 cm
  - Thickness - 10 cm
- Nominal Weight
  - 38 Kg per sq.m. (unfilled)

AceWall™ Panels

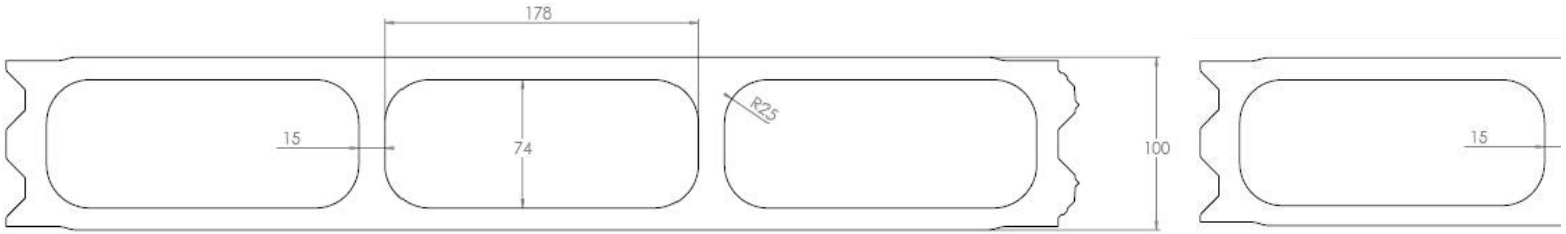
- Precision cut to tight tolerance

- Rapid installation
  - 250 sq.m. per 8 hour shift
  - 7 installers

- Tongue and groove joints
  - Integral spacing control
  - Plaster adhesive in joints
  - Flush finishing
  - High quality finish

AceWall™ Panel Section Detail

All dimensions in mm



AceWall™ Panel - Performance

Characteristic	Single Partition Wall Unfilled	
Thermal Insulation (ASTM C518-4)	Resistance	0.245 m^2.K/W
	Conductivity	0.489 W/m.K
Sound Insulation (AS 1191)	Sound Rating	Rw(C;Ctr) = 35(-1;-3) dB
Fire Resistance (AS 1530.4)	Structural Adequacy	Not Applicable
	Integrity	118 mins
	Insulation	94 mins
	FRL -/90/90	

AceWall™ Panel – Performance
(Cont´d)

Property	Single Partition Wall Unfilled
Uni-Axial Compressive Strength	100 kN/m
Uni-Axial Tensile Strength	28.8 kN/m
Water Absorption	< 5% by weight after 24 hour immersion
Mohr Hardness	1.6

AceWall™ Panel - Physical

Parameter	Single Partition Wall Unfilled
Width	0.60 m
Height	2.10 m to 3.60 m
Thickness	0.10 m
Tolerance	± 0.5 mm
Weight per sq.m.	38.0 Kg
Panel weight (3 m height)	68.40 Kg
Cavity cores per panel	3
Cavity volume per panel (3 m height)	0.119 m3 (119 litres)
Cavity volume per sq.m.	0.066 m3 (66 litres)
Drying shrinkage	None

Strength Test

- Practical test to demonstrate the strength of the panel:
  - Steel bar fixed to an installed demonstration wall
  - Fixings – 4 x 6mm fixing screws (HILTI screw locking devices)
  - Man weighing 85 Kg successfully supported

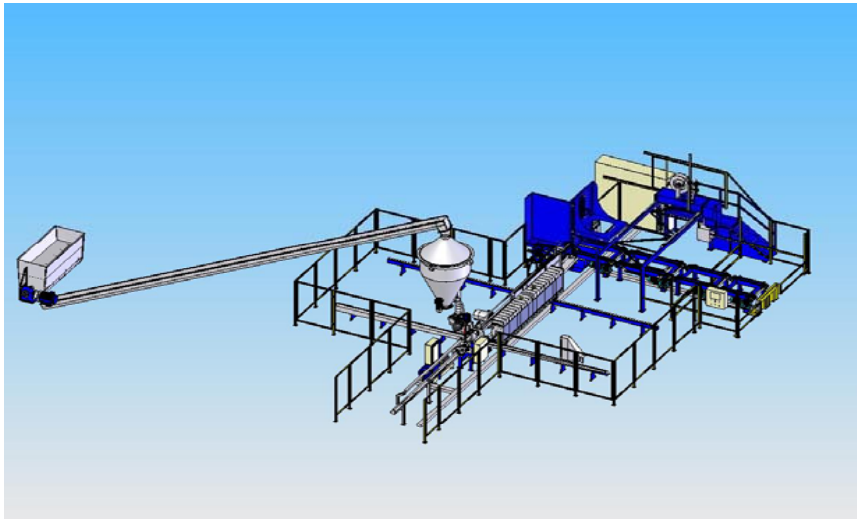
Note:

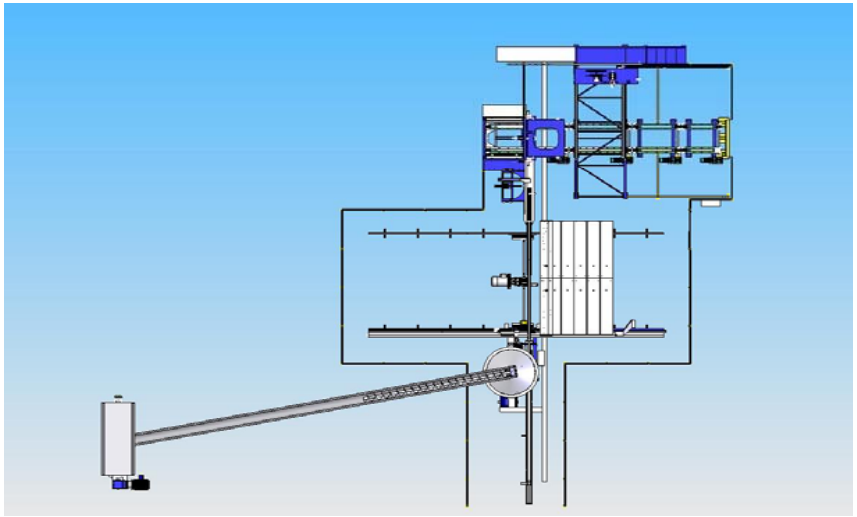
The panel is capable of supporting the weight of a standard TV, central heating or air conditioning units, but will not support heavy wall-mounted bathroom fixtures (e.g. toilet, bidet, washbasin) unless these are also supported by the floor. If a wall suspension is required the solution is to make a local break in the wall and backfill locally with a concrete mix

AceWall™ Production Plant

AceWall™ Factory

- Precision moulding process
- Computerized operation
- Advanced automation
  - Process control
  - Palletization
  - Process alerts





- Capacity
  - 1 panel per minute
  - 750,000* sq.m. per year
- Environmentally friendly
  - No emissions

* 9 Form fully automatic machine

AceWall™ Factory

- Advanced PLC-based automation
- Full built-in fault monitoring and diagnostic management
- Control, monitoring and diagnostics possible via internet-link
- Full chemical and mechanical process control
- Full safety interlocks and sensors
- Designed for 24/7 operations
- Rapid automated production of high quality panels (one per minute)
- Free or forced air convection drying of panels prior to shipment

Environment

Carbon Emissions

- Kyoto Protocol – Carbon Credit mechanism adopted by 170 countries
- Low carbon footprint (embodied energy) of AceWall™ product due to:
  - *Extraction of raw gypsum materiel (can use industrial waste gypsum products)*
  - *Production process, local transportation to site, installation process*
  - *Full recyclable disposal at the end of useful life (re-calcination)*
- Avoidance of brick, cement and concrete produced by burning of fossil fuels
- Brickworks give rise to soil erosion caused by mining of clay
- Gypsum based building materiels now preferred in countries such as China
- AceWall™ Factory:
  - *Environmentally friendly*
  - *Gypsum may be extracted from industrial waste (flue gas or phospho gypsum)*
  - *No pollution, no water or materiel waste (mould cleaning water recycled)*
  - *No gas or chemical emissions*
  - *Low noise level (no ear protection required)*
  - *No sewerage disposal necessary (other than for workforce and office)*

Australia – Energy Consumption

- Upto 10% of Australia's annual energy consumption has been attributed to energy embodied in the construction of residential buildings (includes materiels and construction process)
- Estimates suggest that the embodied energy in a current standard residential building construction is equivalent to 15-20 years of occupational energy
- The Australian materiels industry accounts for 20% of the national energy budget each year
- Since Australia mostly uses fossil or solid fuel as its energy source there is a direct correlation between Embodied Energy and CO_2 emission
- Embodied Energy is therefore an important component of the life-cycle energy use attributable to residential buildings in Australia
- ***AceWall™ has significantly lower Embodied Energy than its counterparts such as concrete, cement and brick***

CO_2 Emissions - A Comparison[1]

AceWall™ technology compared to brick veneer as external wall cladding of residential buildings in Australia

Product	Drying	Embodied Energy	CO_2 Emission
AceWall™	Air Dried	190 MJ/m²	21.8 Kg/m²
AceWall™	Drying Room	240 MJ/m²	25.7 Kg/m²
Brick Veneer	N/A	555 MJ/m²	58.4 Kg/m²

It is estimated that Australia-wide use of AceWall™ type product instead of brick veneer for external cladding of residential dwellings would result in a saving of 63% of applicable CO_2 emissions

It is further estimated that this saving equates to the total amount of emissions liberated in a year from domestic consumption (heating, cooling and cooking) of all households in South Australia

1 – Data source: Ecologically Sustainable Development: Approaches in the Construction Industry
Robert Omahen, Regensburg University, 2002

Market Segments

- Internal partition walls
  - Internal partition walls for high rise developments, new housing and industrial projects as well as upgrades to existing premises, including offices, factory premises, railway stations, hospitals, schools, airport terminals, etc
- External walls for housing and low rise buildings
  - Housing and building development projects which traditionally use textured concrete panels or brick veneer for external wall solutions
- Feature walls and fencing
  - The panel has a number of diverse applications such as external border or feature walls for residential and non-residential projects, it can also be used for fencing.

Product Cost Advantages

- ***Light Weight*** (reduced cranage, foundation costs)
- ***Precise Dimensions*** (certainty in design and construction tolerances)
- ***Reduced Construction Time*** (30% of conventional blockwork)
- ***Reduced Site Labour*** (50% of conventional blockwork)
- ***High Strength-to-weight ratio*** (construction materiel efficiency)
- ***Reliable Supply*** (abundant raw materiel)
- ***Minimal Training*** (avoids blockwork and rendering skills)
- ***Reduced Materiel Holding*** (rapid “delivery to installation” time)
- ***Reduced Project Management*** (simplified logistics and skill interaction)
- ***Carbon Credits*** (avoidance of penalties for excess carbon emissions)

= Reduced Cost!!