

Presented By: Steve Marskell

FOUNDING DIRECTOR OF MAGNESIUM OXIDE BOARD CORPORATIONS GLOBAL GROUP OF COMPANIES



THERMAL MASS CO-EFFICIENCIES PLAY A MAJOR ROLE IN SUSTAINABLE PROJECTS AND ARE CRITICAL IN DELIVERING HIGHER LEVELS OF FIRE PROTECTION:

There is a strange word that is overlooked in many cases throughout global building codes and is rarely used in the assessment of sustainability of projects:

The Word is **CALORIFIC VALUE**

CALORIFIC VALUES are applied to materials based on “the amount of heat released by a unit weight or unit volume of a substance during complete combustion”

With ZERO being the best the following graph shows where **ResCom High Performance** magnesia cement boards sit to that of other building materials;

TABLE 1:
HEAT OF COMBUSTION OF VARIOUS MATERIALS

Material	Calorific Value MJ/m ²
Stone, concrete, glass	~0
ResCom MGO Board	0.1 to 0.25
Stonewood	1.1 to 1.3
A2 category mineral/PE core	~2.5
Flexible sarking type material	~2.5
Glasswool insulation	~6
Dupont Corran (acrylic polymer and alumina trihydrate)	9
“FR” category mineral/PE core (70/30 mix)	~13
Wood	16
High Pressure Laminate	18
Glass Reinforced plastic	21
Rigid Polyisocyanurate (PIR)	24
Rigid Polyurethane (PUR)	24
Phenolic	29
Expanded Polystyrene (EPS)	38
Polyethylene (PE)	43
Petroli	44

Source: International Fire Engineering Guidelines 2005 | CSIRO | Various ISO 1716 test results

CALORIFIC PERFORMANCE of products has

come under scrutiny with Independent

Testing carried out in CANBERRA ACT

Australia of leading suppliers of Fibre Cement barrier protection boards.

These test further highlighted the risks

associated with products that have medium to higher Calorific Value Scores:

- Test Rig 1: Failed in just under 7min
- Test Rig 2: Failed in just under 8min



Whereas independent testing on the same rig (picture to the right) of ResCom High Performance 6mm magnesia cement board lasted over 35min without catastrophic failure.

When you look deeper into the science and performances that surrounds the importance of Calorific performance in various products it opens up a new and exciting world of innovative applications when combining these Zero to Low score value products into holistic building systems:

High Level Structural Fire Engineers have accumulated structural information that is extremely damning on systems that have a higher CALORIFIC value of more than 13 and are now looking to have the finding benchmarked around the world.

The risks associated with using these products in construction is extremely high due to the failure of the products to structurally perform when exposed to a heat source.

Example 1: TRADITIONAL

- Dens Glass has a CALORIFIC value of 10
- Glass Wool Insulation has CALORIFIC value of 6
- System Value = CV of >16

Example 2: Innovative Disruptive Technology

The combination of ResCom High Performance Magnesia Cement board in a wall system will deliver a lower CALORIFIC value therefore delivering a greater level of all round protection.

- ResCom Magnesia Cement Board has a CALORIFIC value of <0.25
- Glass Wool Insulation has CALORIFIC value of 6
- System Value = CV of <6.25
- ResCom Magnesia Cement Board has a CALORIFIC value of <0.25
- Rockwool Insulation has CALORIFIC value of <1.3
- System Value = CV of <1.55

COMPARATIVE CHART

Compressed Fibre Cement (CFC)

VS

High Performance Magnesia Cement

STRENGTH AND MOISTURE RELATED DATA: SCYON INTERIOR WET AREA FLOORING

PHYSICAL PROPERTY	SATURATED CONDITION	EQUILIBRIUM CONDITION 23°C – 50% RH	STANDARD
Average Bending Strength Category	930	>7MPa 2 B	AS/NZS 2908.2
Density in kg/m ³ (Oven Dry) Type		Passes	AS/NZS 2908.2 AS/NZS 2908.2
Water Tightness	42.7%	Passes	ASTM C1186
EQ Moisture Content		5.6%	ASTM C1186
Moisture Movement 30-90% relative humidity*		A direction 0.05% B direction 0.05%	ASTM C1186
Dimensional Conformance		Passes	AS/NZS 2908.2

ResCom-Flooring

RESIDENTIAL & COMMERCIAL FLOORING

PHYSICAL PROPERTY	CONDITION	CONDITION	STANDARD
Average Bending Strength		> 14MPa	ASTM C 1185-08 (2012)
Density in kg/m ³	1000		ASTM C1185-08 (2012)
Water Tightness	13.2%	Passes	ASTM C1185-08 (2012)
Water absorption		5.6%	ASTM C1185-08 (2012)
EQ Moisture content		0.064	ASTM C1185-08 (2012)
Moisture movement 30-90% relative humidity*			ASTM C1185-08 (2012)
Humidified deflection (mm) 32c,40%RH, 48hrs	2.18		ASTM C473-12
Dimensional conformance		Passes	ASTM C1185-08 (2012)
Fire classification building		Class A1 _{fl}	EN 13501-1:2007+A1:2009
Flame Spread & Combustibility	0		ASTM E84
FRL Performance	>120min		ASTM E119
Freeze thaw	789	Passes	ASTM C1185-08 (2012)
Nail-Head pull through (N)	2278N		ASTM D1037-12 (Section 15)
Lateral nail resistance		Passes	ASTM D1037-12 (Section 13)
Falling ball impact	Unbroken @ 3mtr heights	Passes	ASTM D1037-12 (Section 21)
Diaphragm capacity		Passes	ASTM E455-11 & AS/NZS2908.2:2000