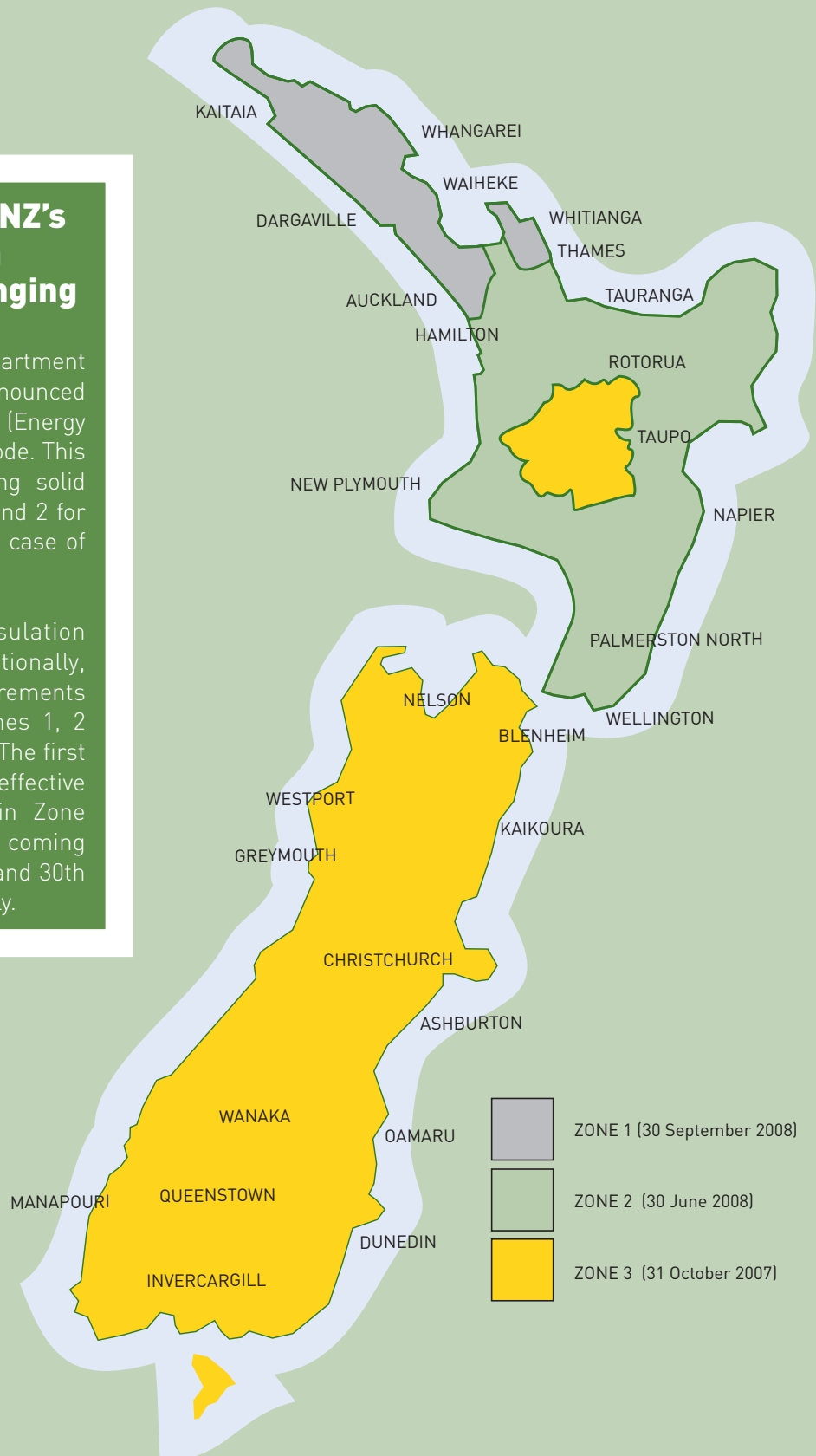


# MASONRY INSULATION SOLUTIONS

## After many years, NZ's thermal insulation standards are changing

On 17th August 2007, the Department of Building and Housing announced major changes to Clause H1 (Energy Efficiency) in the Building Code. This is the first change covering solid wall insulation in Zones 1 and 2 for 30 years, or 11 years in the case of Zone 3.

The new thermal insulation standards are applied nationally, with differing R-value requirements specified over Climate Zones 1, 2 and 3 (ref. NZS 4218:2004). The first wave of changes became effective from 31st October 2007 in Zone 3, with two further rounds coming into effect from 30th June and 30th September 2008 respectively.



## The big shift - the benefit of thermal mass is only recognised if it is available to the interior

The new R-values required for masonry recognise the energy and comfort benefits of thermal storage capability of solid construction. However this means that where the thermal mass is not available to the inside such as when the strap, insulate and line method is used higher R-values will be required.

The required R-values using the schedule method for masonry walls where the thermal mass **is** available to the room are;

Zone 1 - R 0.8 Effective 30th September 2008

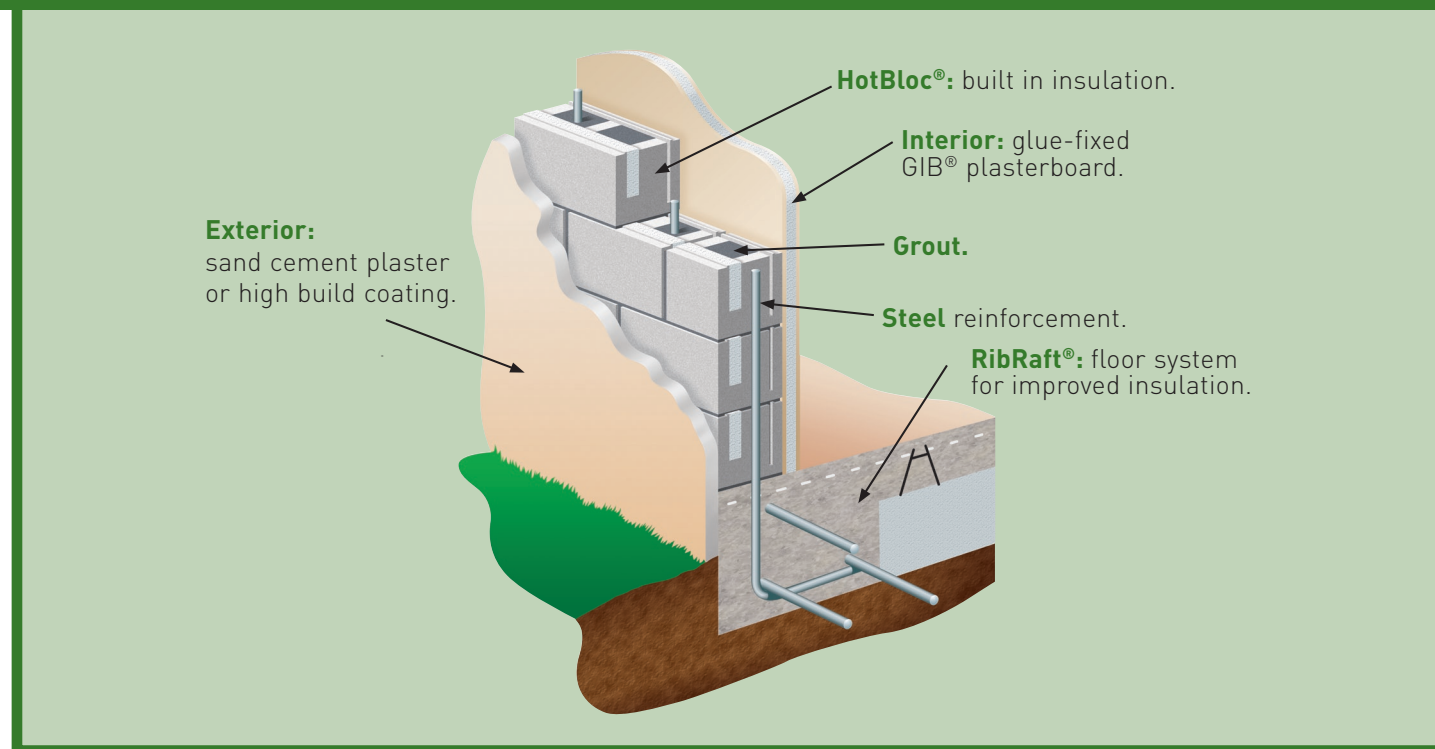
Zone 2 - R 1.0 Effective 30th June 2008

Zone 3 - R 1.2 Effective 31st October 2007

To gain the advantage of the thermal mass of masonry and lower R-values the insulation needs to be within the block such as with HotBloc® or on the exterior face.

For further information, refer to NZ Building Code compliance document NZS 4218:2004 'Energy efficiency - housing and small building envelope' revised by the Department of Building and Housing Clause H1 Energy Efficiency - Third Edition, Table 2(b).

## HotBloc® Masonry Solution *Refer to Firth's Energy Efficient Masonry Construction Brochure*

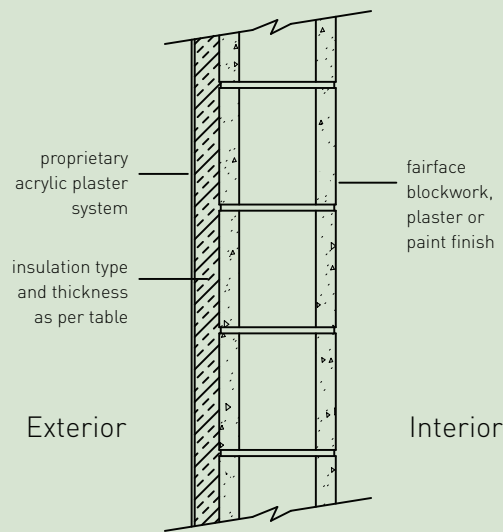


Climate Zone	Minimum R-values (m <sup>2</sup> °C/W)					Firth HotBloc® + Concrete Floor Solution
	Roof	Wall	Floor	Glazing (Vertical)	Glazing (Skylights)	
<b>Zone 1</b> from 30/09/08	R 3.5	R 0.8	R 1.5	R 0.26	R 0.26	Minimum of 25 Series HotBloc® walls + ** RibRaft® floor
<b>Zone 2</b> from 30/06/08	R 3.5	R 1.0	R 1.5	R 0.26	R 0.26	Minimum of 25 Series HotBloc® walls + ** RibRaft® floor
<b>Zone 3</b> from 31/10/07	R 3.5	R 1.2	R 1.5	R 0.26	R 0.31	Minimum of 25 Series HotBloc® with 10mm GIB® plasterboard + ** RibRaft® floor

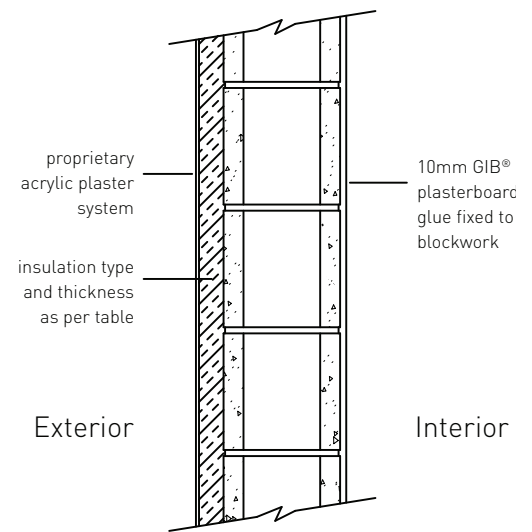
\*\* RibRaft floors to be no less than 80m<sup>2</sup> as a square. If not square, area to perimeter ration must be greater than 2.3

# Masonry Solution External Insulation

## Interior Fairface Block



## Interior Plasterboard



R-Value	Masonry Option	Required Insulation Thickness		Required Insulation Thickness	
		'S' Grade Polystyrene	Extruded Polystyrene	'S' Grade Polystyrene	Extruded Polystyrene
0.8	15 series	25mm	25mm	20mm	25mm
0.8	20 series	20mm	25mm	20mm	25mm
0.8	25 series	20mm	25mm	20mm	25mm

R-Value	Masonry Option	Required Insulation Thickness		Required Insulation Thickness	
		'S' Grade Polystyrene	Extruded Polystyrene	'S' Grade Polystyrene	Extruded Polystyrene
1.0	15 series	35mm	25mm	30mm	25mm
1.0	20 series	30mm	25mm	30mm	25mm
1.0	25 series	30mm	25mm	30mm	25mm

R-Value	Masonry Option	Required Insulation Thickness		Required Insulation Thickness	
		'S' Grade Polystyrene	Extruded Polystyrene	'S' Grade Polystyrene	Extruded Polystyrene
1.2	15 series	40mm	30mm	40mm	30mm
1.2	20 series	40mm	25mm	35mm	25mm
1.2	25 series	35mm	25mm	35mm	25mm

Notes: Tables are developed based on the following assumptions;

- (i) All block cells are filled
- (ii) The thermal conductivity of 'S' Grade Polystyrene is  $k = 0.039 \text{ W/m}^\circ\text{C}$ ,
- (iii) The thermal conductivity of Extruded Polystyrene is  $k = 0.028 \text{ W/m}^\circ\text{C}$
- (iv) Minimum thickness for extruded Polystyrene is 25mm

## Calculation Method

Clause H1 (Energy Efficiency) of the Building Code allows for the use of a Calculation Method as contained in NZS4218:2004. The R-values for specific HotBlocs can be obtained from Firth Information Services on 0800 800 576.

## Masonry Solution Internal Insulation

When insulation is to be provided on the interior face of masonry, the thermal storage benefits of solid construction are lost. This means that the temperature regulating comfort levels normally available from solid masonry construction are not achieved. To achieve a similar energy efficiency when the exterior walls are insulated on the inside, two options exist as outlined in CCANZ publication IB 87 ([www.cca.org.nz](http://www.cca.org.nz));

(i) Provide uninsulated masonry walls as interior room dividers to provide for thermal storage.

The R-values summarised in Table 2(b) (R 0.8,

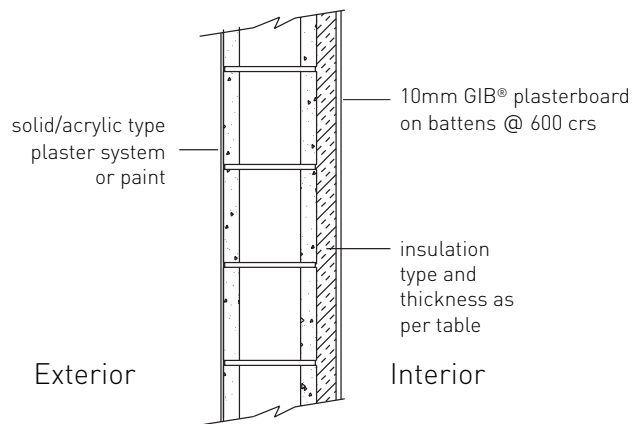
R 1.0, R 1.2) can be used for strapped and lined construction if approximately 40% of the interior partition walls are solid non insulated masonry.

(ii) Increase the interior insulation provided to the strapped and lined interior walls to compensate for the loss of energy saving benefits of thermal storage.

If the higher scheduled R-values of Table 2(b) are used in the floor and roof, a R-value of 1.5 is required for the strapped, lined and interior insulated walls to achieve a building with equivalent energy efficiency (see below).

## R1.5 Masonry Solution Internal Insulation

### Interior Insulation



Masonry Option	Required Insulation Thickness	
	'S' Grade Polystyrene	Extruded Polystyrene
15 series	60mm	40mm
20 series	60mm	40mm
25 series	50mm	40mm

## SUSTAINABILITY: THE FIRTH CONCRETE & CONCRETE MASONRY SUSTAINABILITY LIFECYCLE

- ✓ Environmentally compliant manufacturing plants
- ✓ Surplus water and some aggregates recycled
- ✓ Low transport impacts
- ✓ Leftover concrete returned from construction sites
- ✓ Passive solar heated thermal mass makes completed buildings more energy-efficient

- ✓ Most wash water returned from construction sites
- ✓ Highly durable, low maintenance buildings and no rot
- ✓ High degree of noise control
- ✓ Inherent fire resistance
- ✓ Overall longer effective building life
- ✓ Demolished concrete can be recycled as hard fill or aggregate

For more on Firth's contribution to building a sustainable tomorrow today, visit [www.firth.co.nz](http://www.firth.co.nz) or call us on 0800 800 576 for our free brochure.

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