Insulation Regulations: A step towards building energy efficiency standards

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DEPARTMENT OF PLANNING AND URBAN GROWTH

Introduction

Today's new Victorian homes are mostly energy wasteful. Only 20% have ceiling insulation installed during construction. Less than half have any wall insulation. Poor design and orientation can significantly reduce performance. Alterations and retrofitting of insulation are expensive and inconvenient.

If we are to reduce the emission of greenhouse gases, cut energy bills and improve comfort, we must change the way new houses are built. Yet the need for change in building design and construction techniques must be balanced with the need to upgrade trade skills and involve architects and building surveyors.

In recognition of this challenge, the Victorian Government has developed a two stage process to dramatically reduce the energy consumption and improve the comfort of new homes.

March 1991: The 3 Star Home

In 1991 it is proposed that all new homes in Victoria be required to satisfy thermal insulation criteria for the three main structural components:

- Ceilings
- Walls
- Floors

Decisions about the way in which these criteria are met will be left to the owner, as long as safe and acceptable insulating materials are used. Homes built to the 3 Star Standard will save around 40% of the heat lost from an uninsulated home. This in turn could save householders around $300 on their annual energy bills.

1993: The 5 Star Home

Over the next three years, more sophisticated performance standards, developed from the existing voluntary 5 Star Design Rating will be introduced to cover:

- Ceilings
- Walls
- Floors
- Windows, orientation and internal mass
- Fixed appliances and lighting

The 5 Star concept will enable higher efficiency standards and more trade-offs between performance on individual elements. During the next three years, training programs will be put in place, new products introduced, and demonstration houses built.

A 5 Star home will save around 60% of the heat lost from an uninsulated home.

The 3 Star Home - Benefits

Many Victorians already enjoy the energy savings and comfort improvements that effective roof insulation brings. A 3 Star home will not just provide an improved indoor environment. Each year, a 3 Star home with gas central heating will produce 2 to 3 tonnes less carbon dioxide, a key contributor to the Greenhouse Effect.

In addition, the fact that over time all new homes will meet at least the 3 Star standard will reduce demand for new energy facilities and keep down gas and electricity prices.

The 3 Star Home - Details

The specific requirements proposed for 3 Star homes from March 1991 are:

	Option A Min. Overall R Values (a)	Option B Min. Overall R Values (a)
Ceiling	R2.2(b)	R2.2(b)
Walls	R1.3(c)	R1.7(d)
Floor	R1.0(e)	R0.4(f)
Flue or Chimney of Open Fireplaces	damper or flap (g)	damper or flap (g)

Notes:

(a) 'R' values indicate resistance to heat flow. The higher the R value, the greater the resistance to heat flow.

(b) An overall R value of R2.2 is equivalent to R2.5 insulation batts installed between the ceiling joists.

(c) R1.3 is equivalent to reflective foil insulation in a timber framed wall.

(d) R1.7 is equivalent to R1.5 insulation batts installed between timber studs in a brick veneer or weatherboard wall or R1.1 foam in a cavity brick wall.

(e) R1.0 is achieved by a concrete slab-on-ground floor or timber floor insulated with reflective foil.

(f) R0.4 is equivalent to an uninsulated timber floor or suspended concrete slab floor.

(g) An open fireplace draws large amounts of air from the house. When not in use, an open fireplace can increase heat loss by 10% or more unless it is closed off.

Where a builder can demonstrate to the building surveyor that alternative construction techniques can achieve the same thermal performance as the 3 Star Home, the alternative will be permitted.

Cavity brick, mudbrick and solid stone walls built on a concrete slab on the ground will be exempt from wall insulation requirements due

to the current high costs of insulating these types of walls. These houses will not be recognised as meeting the 3 Star Standard unless they comply with Option A or B above. Cavity brick, mudbrick and solid stone walled houses will be expected to comply with the performance standard when it is introduced.

The period up to the introduction of the 5 Star standard will allow for the development of cost-effective insulation products and installation practices suitable for these wall types.

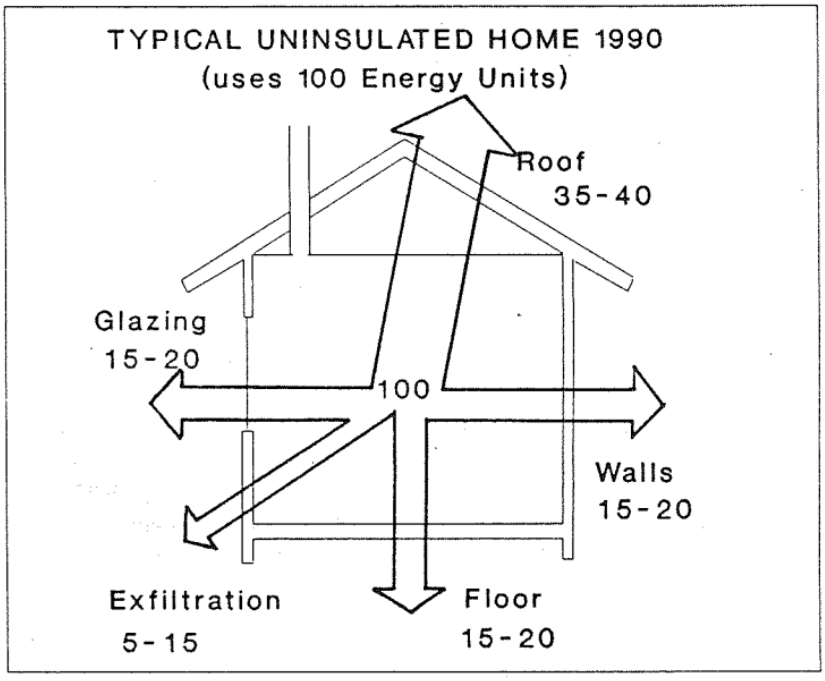
A significant amount of heat is lost from the building via exfiltration and through the windows. Measures which address this heat loss will be included in the 5 Star standard. This will allow time for education programs, training in new techniques and the introduction of new products.

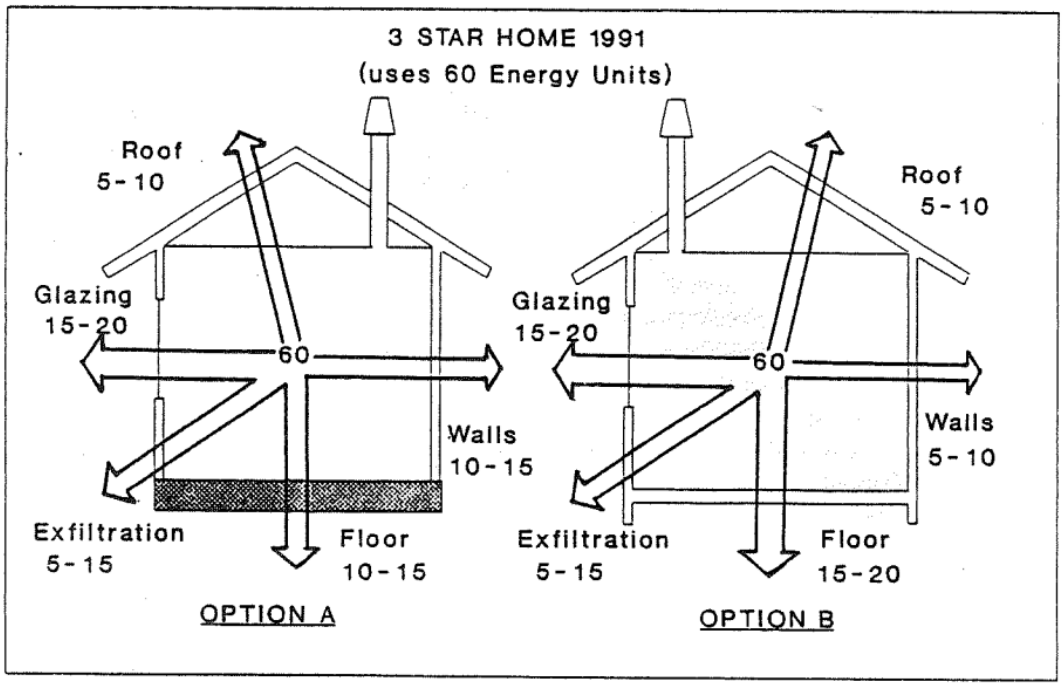
Standards are based on a "bare house" construction and it is assumed that thermal performance would also be improved with the installation of carpets, curtains, weatherstripping and other fixtures.

The Effect on Heat Loss

Increasing the R values of building elements by insulating them can greatly reduce the amount of heat lost from the building. In a typical uninsulated home, 35-40% of heat is lost through the ceiling, 30-40% through the walls and windows, and 15 - 20% through the floor.

In a 3 Star home, the amount of heat lost through the ceiling will be significantly reduced. The amount of heat lost through the walls, and in many cases the floor, will also drop.





The 3 Star Home - Costs

For most new home buyers today, ceiling insulation is a high priority purchase. However, a great number of home owners do not install it until after the initial construction of the home. This adds to insulating costs, and consequently 20% of homes are never insulated and many are only partially insulated. Wall insulation is particularly difficult and expensive to install after construction.

From 1991, insulation will be installed during construction, when it is cheapest to do it. And it can be paid off as part of the mortgage, at much less than credit card interest rates.

For a typical 160m² 3 Star home, insulation will cost $1400 to $2000 fully installed. This will increase monthly mortgage repayments by $20 to $28 (25 yr loan @ 16.5%). For most people, this will be more than covered by energy savings from the first year. And, with energy prices rising each year, savings will increase each year so that in the long run, the 3 Star home will become a great investment in both money and comfort terms.

If, like most people, you planned to insulate the ceiling anyway, the extra cost of a 3 Star home is only $300 to $500, which can be paid off on your mortgage.

The Cost to Home Owners is:

Timber Floor

	Option A	**Option B**
Ceiling	$952 (R2.5 batts)	**$952 (R2.5 batts)**
Walls	$325 (RFL)	**$450 (R1.5 batts)**
Floor	$648 (RFL)	**0**
Total	$1,925	**$1,402**

Slab Floor

	Option A	Option B
Ceiling	**$952 (R2.5 batts)**	$952 (R2.5 batts)
Walls	**$325 (RFL)**	$450 (R1.5 batts)
Floor	**0**	0
Total	**$1,277**	$1,402

Assuming:

Average New Home		Insulation Costs	
floor area	160m²	R2.5	$5.95 per m²
wall area	100m²	R1.5	$4.50 per m²
glass area	40m²	RFL (wall)	$3.25m²
		RFL (floor)	$4.05m²

Implementation Program

1. Proposed Timetable for Insulation Regulations (3 Star)

24 Oct 1990	RIS published Commence industry education program
Nov 1990	Complete public consultation period
Dec 1990	Report to Minister Formal making of regulations
Jan 1991	Launch of supporting promotional campaign
Mar 1991	Commencement of regulations
Early 1992	Review of implementation of regulations

2. Proposed Timetable for Performance Standard (5 Star)

The following timetable is provisional only and could be amended within the three year (1990-1993) time frame. The target implementation date for the introduction of the performance standard, (December 1993), could be brought forward if progress permits.

(a) Development of DRAFT STANDARD (Start late 1990)

Dec 1990	Release of an Issues Paper on proposed (5 Star) performance standard covering options for scope, form, decision criteria, etc. relevant to developing the standard.
Jan - Mar 1991	Undertake consultation with key interest groups on the Issues Paper.
June 1991	Release Options Paper canvassing a number of options for the proposed standard and including cost-benefit analyses of each option.
July - Oct 1991	Undertake consultation on Options Paper.
Dec 1991	Select preferred option which will be known as the proposed Draft Standard.

(b) Promotion of DRAFT STANDARD (Start early 1992)

- Undertake detailed promotion of the Draft Standard with relevant organisations, builders, architects, the public, etc.
- Prepare and implement targetted education and training programs with industry, education establishments, etc.
- Organise construction of demonstration/ display houses to the Draft Standard.

(c) Review of DRAFT STANDARD and Preparation of Regulations (Start mid 1993)

- Undertake a review of the Draft Standard with interest groups and the building industry.
- Prepare appropriate draft regulations, Regulatory Impact Statement and information/promotional material.

(d) Implement Regulations (Before end of 1993)