

# Supercrete<sup>TM</sup>

Sustainable Cost Effective Construction & Coating Systems



## Thermal Calculation Design & Installation Guide



**Supercoat<sup>TM</sup>**

**100% NZ**  
Owned & Operated

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# 1.0 Thermal Principles

## 1.1 Heat Flow and Temperature

Heat is a form of energy resulting from the motion of atoms, molecules and ions. It travels as conduction through matter or as radiation travelling through space. The SI unit of heat is the Joule (J). The units kilojoule (kJ), megajoule (MJ) and kilowatt-hour (kWh) are often used.

$$1 \text{ kWh} = 3.6 \text{ MJ}$$

Temperature (T) is a measure of the thermal state of a material due to the presence of heat. Degrees Celsius (°C), is commonly used for everyday measurement of temperatures although the S.I. unit is the Degree Kelvin (°K). The Kelvin scale has its zero at "absolute zero" when all atoms, molecules and ions cease to move.

This occurs at a temperature of - 273.16°C. The Celsius scale uses the freezing point of water as its zero, with the boiling point of water occurring at 100°C. A change in temperature of 1°K is the same as a change in temperature of 1°C. To convert from one scale to the other, the following formula is used:

$$T (^{\circ}\text{K}) = T (^{\circ}\text{C}) + 273.16$$

## 1.2 Energy Transfer

Heat flow will occur between two bodies if there is a difference in their temperatures. This exchange of energy always occurs from the hotter to the colder surface.

Objects at different temperatures will exchange energy via three thermal mechanisms; conduction, convection and radiation.

Thermal conduction occurs whenever energy transfer is due to the exchange of kinetic energy between particles at the atomic or molecular level. In metals, thermal conduction takes place through the motion of free electrons. Liquids and non-electrically conducting solids conduct heat primarily via longitudinal oscillations of the lattice structure. Gases conduct via elastic collisions of molecules.

Thermal convection involves energy transfer from a solid to a fluid such as air or water, or energy transfer within a fluid due to the movement of zones at higher or lower temperature than the surrounding fluid. Convection heat transfer often refers to the flow of heat from one surface, through a fluid, to another surface. Since heat transfer in fluids involves both convection and conduction, reference to convection heat flow rates often includes the conduction component.

Natural convection occurs when fluid in contact with a hot surface is heated and rises due to its expansion and resultant lower density. This fluid is replaced by cooler fluid of lower density which also starts to expand and rise, and a cycle is established.

Fluid near a colder surface will be cooled, become denser, start to fall, and again a cycle is established.

Forced convection heat transfer occurs when fluid currents are produced by some external source such as the wind, blowers or pumps. Thermal radiation is energy emitted by a body as a consequence of its temperature alone.

Radiant energy takes the form of electromagnetic waves or photons. Unlike conduction or convection there is no heat transfer due to the movement of matter.

In a vacuum all radiant energy travels at a constant speed, (the speed of light), irrespective of its energy or wavelength.

The radiation properties of materials, such as emittance, absorptance, reflectance and transmittance are wavelength dependent. Emittance generally refers to a property of a material in the long wavelength part of the spectrum, i.e. its ability to emit in the far infrared. Absorptance generally refers to short wavelength properties, i.e. the ability to absorb light.

Emittance ( $\epsilon$ ) is a measure of the ability of a surface to radiate. It is the ratio of the thermal radiation emitted from a surface to that of a perfect radiating body at the same temperature.

Reflectance ( $\rho$ ) is a measure of the ability of a surface to reflect radiation. It is the ratio of the thermal radiation reflected from a surface to that which falls on it.

Absorptance ( $\alpha$ ) is a measure of the ability of a surface to absorb radiation. It is the ratio of the thermal radiation absorbed by a surface to that absorbed by a perfectly absorbing surface.

Transmittance ( $\tau$ ) is a measure of the ability of a surface to transmit radiation. Opaque materials do not transmit radiation.

## 1.3 Conductance of Heat

The heat loss or gain through a building element such as a wall, roof or floor, is determined by:

- the area of the element;
- the air speed on either side of the element;
- the resistance to heat flow of the element as determined by the materials and air spaces making up the element.

## 1.4 R Values

The resistance to heat flow between two surfaces at different temperatures is a combination of radiation, conduction and convection. The relatively small range of temperatures to which buildings are subject allow these three resistances to be combined as a single resistance, often known as the R Value. Homogeneous materials, air gaps and surfaces can all be assigned resistances.

The units used are  $\text{m}^2 \cdot ^{\circ}\text{K}/\text{W}$ .



## 1.5 Construction R Values

Where there is a mixture of materials in a wall there can be an instance where two materials occupy the same space such as a timber house frame that has insulating Batts filling the space between the studs & dwangs. The actual resistance of that layer of wall is a combination of the Batts' resistance & the resistance of the timber. To get a more accurate R Value these two resistances are apportioned according to the area of each material occupies. NZS 4214 gives formulas & methods for working out the construction R Values of walls. At the back of this Guide are data sheets for Construction R Values of timber stud wall with either Supercrete 50mm Panel Cladding or 75mm Panel Cladding, as well as data sheets for Supercrete 75mm Soundfloor on top of either timber or light gauge steel joists.

Block wall generally are not affected by this because they are usually constructed of layers of homogeneous materials. The exception would be if the internal surface is lined with plasterboard on battens with masonry Batts in the batten space.

## 1.6 R Values of Bulk Materials.

Bulk materials have R Values directly proportional to their thickness. The R Value can be calculated from:

$$R = d/k$$

Where:

k is the conductivity; and

d is the thickness.

## 1.7 Resistance of Air Spaces

The radiation component of heat transfer across an air gap depends on the emittance of the surfaces on either side, but otherwise is not strongly dependent on gap width unless that width is small. When either one, or both surfaces have a low emittance, the radiated heat flow across the gap is reduced significantly.

When air spaces are vented, or air is forced to circulate in, or move through the space, the heat transfer by convection becomes the dominant factor.

## 1.8 Resistance of Surfaces

Differences between surface temperature and air temperature occur because the air film next to the surface resists the flow of heat to the bulk of ambient air. This air film resistance causes a sharp temperature gradient next to the surface.

The air film resistance is dependent on the emittance of the surface, the direction of heat flow (for all but vertical surfaces) and the amount of air movement next to the surface. If air movement is forced past the surface (e.g. wind outside, fans inside) the heat losses are dominated by forced convection.

Surfaces with a low emittance offer better insulating properties in still air conditions. Nearly all common building

surfaces, including that of glass, have a high emittance of about 0.90, however.

Clean, bright metal surfaces such as that of aluminium foil have a low emittance.

## 1.9 Building Section U-Value

A building element is made up of a number of materials, some of which create air spaces. Heat transfer is determined by a number of thermal resistances, including inside and outside air film resistances.

This is mathematically equivalent to having a single total resistance,  $R_T$ , equal in value to the sum of the individual resistances.

The overall heat transfer coefficient, or U-Value, is calculated as the reciprocal of the equivalent total resistance. U-Value may also be referred to as thermal transmittance. Although transmittance and conductance use the same units, i.e.  $W/m^2 \cdot ^\circ K$ , conductance is calculated from surface to surface, whereas transmittance is calculated from air to air. The U-Value represents the rate of heat transfer through a  $1m^2$  area of the building element when there is a temperature difference of  $1^\circ K$  between the air on either side.

## 1.10 Thermal Mass

The heat capacitance of a material is a measure of how much heat must be absorbed by the material to produce a rise in temperature of one Kelvin ( $1^\circ K$ ). This property when applied to building elements is often referred to as thermal mass. Thermal mass delays temperature peaks and reduces the transfer of heat. The effectiveness of mass in a building depends on the area, and to a lesser degree the thickness, of the exposed mass.

Lightweight and heavyweight buildings behave differently thermally and are usually operated differently by the occupants. Heavyweight buildings are much less sensitive to problems caused by over glazing than lightweight buildings, which can overheat very quickly if they have inadequate means of dumping excess heat.

The absorption of heat by mass in the walls or floor prevents the rapid rise in temperature which could otherwise lead to overheating when sunlight is absorbed.

Mass in a building has a stabilising effect by reducing the daily temperature swing.

This thermal mass can be of benefit in winter by absorbing solar radiation coming through windows and making heat available later in the day when temperatures have dropped. In summer, if the building is ventilated in the evening, (when it is cooler outside), the mass of the walls and floor will release heat, giving lower internal temperatures the next day. The effectiveness of storing or releasing heat is greatly reduced if the mass is insulated from the room in any way. A brick veneer wall provides no useful mass because the bricks are thermally isolated from the room by an insulating air gap. Similarly, the usefulness of a concrete slab floor is reduced when it is covered by carpet.

# 2.0 Calculating the Thermal Performance of a Building

## Steady State versus Thermal Simulation

The U-value of a building element is a good indicator of the conductance of heat through it, if both the inside and outside of a building stay at a constant temperature for a long period of time, i.e. when “steady state” conditions apply. In real situations however, the external temperature changes in a non uniform way over a 24 hour cycle, and the internal temperature is also likely to vary with time. Consequently the thermal behaviour of a building element is determined by a complex relationship between the conductance and capacitance of the materials from which it is constructed.

**Table 1. R Values of Air Films** (NZS 4214:2006)

Surface Film Air Resistance	R Value m <sup>2</sup> .°K/W
External (R <sub>se</sub> )	0.03
Internal (R <sub>si</sub> )	0.09

**Table 2. Typical R Values of Common Building Materials**

Wall	In	Out
<b>Ventilated</b>		
Air Space, 20-100mm, reflective	0.54	0.54
Air Space, 20-100mm, non-reflective	0.14	0.14
<b>Unventilated</b>		
Air Space, 100mm, reflective	0.61	0.61
Air Space, 20mm, reflective	0.58	0.58
Air Space, 100mm, non-reflective	0.17	0.17
Air Space, 20mm, non-reflective	0.16	0.16
<b>Ceiling/Roof</b>	<b>In</b>	<b>Out</b>
<b>Raked Ceiling/Roof</b>		
Air Space, reflective	0.77	0.53
Air Space, non-reflective	0.17	0.16
<b>Roof Space Ventilated</b>		
Roof Space, reflective	1.36	0.34
Roof Space, non-reflective	0.46	0.11
<b>Roof Space Unventilated</b>		
Roof Space, reflective	1.09	0.56
Roof Space, non-reflective	0.28	0.18
<b>Underfloor Air Space</b>	<b>In</b>	<b>Out</b>
Non - enclosed	0.0*	0.0*
Enclosed – Perimeter wall exposed to wind	0.17*	0.17*
Enclosed – Perimeter wall not exposed to wind	0.3*	0.3*

**Note:**

To obtain actual RValue multiply actual thickness in metres by the R Value in table above  
See NZS 4214 for definitive RValues

The thermal performance of a building is a consequence of further complex interaction between its components.

These dynamic interactions can only be adequately described by modelling them with computer software which simulates thermal performance by using real climatic data, usually on an hourly basis, over an entire year. The calculated heating and cooling energy required to maintain thermal comfort is then used as a basis for assessing the thermal quality of the building envelope.

The information on RValues for air films, materials and air spaces is provided for guidance and does not constitute professional advice. Superbuild International Ltd recommends obtaining professional advice, as necessary, in relation to the information.

**Table 3. Typical R Values for Air Spaces**

Material	R Value for 1.0m thickness (m <sup>2</sup> .°K/W)
Aluminium	0.005
Brickwork	1.63
Carpet & underlay	17.0
Ceramic Tiles	0.88
Cork Tiles	23.33
Concrete (reinforced)	0.65
Concrete Block (190mm)	0.95
Concrete Block (90mm)	1.10
Fibre Cement	4.44
Glass	1.00
Hardboard	6.67
Insulation (glass fibre)	18 – 28
Insulation (polystyrene/UF foam)	20 – 25.6
Insulation (polyurethane)	43.5
Insulation (Rockwool)	15 - 30
Particle Board (high density)	11.57
Particle Board (medium density)	9.2
Particle Board (low density)	6.84
Plaster Board	4.67
Plywood	7.50
Rendering Plaster	1.00
Roofing tiles (concrete)	0.77
Soft Board	18.42
Steel	0.02
Timber (hardwood)	5.00
Timber (pine)	8.33
Vinyl Flooring	1.50

**Note:**

\* Average values  
See NZS 4214 for definitive RValues

**Table 4. Thermal Resistance of Supercrete AAC Products**

Supercrete Product	Thickness (mm)	Density kg/m <sup>3</sup>	Thermal Conductivity Dry W/°K.m <sup>2</sup>	Thermal Resistance Dry m <sup>2</sup> .°K/W	Thermal Resistance 5% moisture m <sup>2</sup> .°K/W	Thermal Resistance 10% moisture m <sup>2</sup> .°K/W
<b>Block CIWS Structural Floor Panel</b>	100	515	0.13	0.68	0.58	0.51
	150			1.02	0.87	0.77
	200			1.36	1.16	1.03
	250			1.71	1.46	1.29
	300			2.04	1.96	1.55
<b>Panel Cladding</b>	50mm	515	0.12	0.39	0.33	0.28
	75mm	515	0.12	0.59	0.49	0.42
<b>Soundfloor</b>	75mm	515	0.12	0.59	0.49	0.42

## 3.0 Examples of Thermal Calculations

Thermal resistance calculation of uninsulated building elements, and what reduction in heat loss can be expected from using Supercrete Cladding Systems.

A dwelling with 120m<sup>2</sup> wall area basing calculations on an average minimum outside temperature of 5°C (cold winter conditions) and an inside temperature of 20°C.

### **200mm Supercrete™ Block Wall with 2-3mm external texture coating + 10mm plasterboard internal lining.**

The thermal resistances are summed up as follows:

Outside air surface, R <sub>se</sub>	= 0.03
200mm thick Supercrete™	
Masonry unit (10% moisture)	= 1.23
Air cavity (non-reflective)	= 0.14
10mm thick Plasterboard	= 0.05
Texture Coating	= 0.01
Inside surfaces air film, R <sub>si</sub>	= 0.09
Total resistance, R <sub>T</sub>	= 1.55 m <sup>2</sup> .°K/W
Transmittance, U = 1/R <sub>T</sub>	= 0.65 W/m <sup>2</sup> .°K

#### **Note:**

For any thickness of Supercrete™ block with render on one side and 10mm plasterboard on the other; the total R Value (RT) for the wall

**= 0.32 + R Value of the Supercrete™ block.**

Heat loss through the AAC wall,

$$\begin{aligned}
 Q_{AAC} &= U \times A \times \Delta t \times \text{time} \\
 &= 0.65 \text{ W/m}^2 \cdot ^\circ\text{K} \times 120 \text{ m}^2 \times 15^\circ \times 10^{-3} \\
 &\quad \times 1 \text{ hour} \\
 &= 1.028 \text{ kWh}
 \end{aligned}$$

### **Consider the same house constructed from 190mm filled masonry block with the same render & 10mm plasterboard on 45mm battens filled with insulation.**

From the BRANZ House Insulation Guide pg 105 the R Value of the wall (RT) is 1.51 m<sup>2</sup>.°K/W

$$\begin{aligned}
 \text{Therefore } U &= 1/R_T \\
 &= 1/1.51 \\
 &= 0.66 \text{ W/}^\circ\text{K.m}^2 \\
 Q &= 0.66 \times 120 \times 15 \times 10^{-3} \times 1 \\
 &= 1.188 \text{ kWh}
 \end{aligned}$$

Therefore there is a saving of 15% in energy loss using Supercrete™ block.

# 4.0 Condensation Control

Atmospheric water vapour will condense when it, or the air containing it, can contact a surface at or below the dew point. The dew point is the temperature at which the water vapour reaches saturation, or 100% relative humidity.

Condensation becomes a problem when it occurs either:

- On interior surfaces of walls, ceilings, windows, etc.
- On the interior of building cavities such as wall cavities, in roof or attic spaces, etc.

Condensation may be controlled or avoided by:

- Controlling relative humidities; or
- Controlling the temperature of interior surfaces.

The short and long term costs of damage caused by condensation, justify consideration of means of avoiding it. It may be controlled by a combination of ventilation, vapour barrier and insulation.

## 4.1 Vapour Barriers

The vapour barrier system should have a permeance no more than 0.1 perm as determined by ASTM- 96-53T (dry cup) or ASTM C355-59T (dry cup) where little or no ventilation of the space on the "cold" side of the cavity can be predicted.

For building elements such as walls, roof/ceilings, etc. the vapour barriers should be continuous and should be installed on the "warm" side of the building material.

In tropical regions, the direction of vapour flow can be reversed and the vapour barrier should be placed on the outside. In addition there should be no membrane (such as external cladding) on the "cold" side of the vapour barrier/insulation system, which has a lower permeance than the vapour barrier itself.

Reference should be made to the manufacturer's literature for the permeance data for the vapour barrier system under consideration. Superbuild International Ltd recommends obtaining professional advice, in relation to condensation control.

## 4.2 Relative Humidity

Under normal circumstances air is not saturated with water. Rather, a certain percentage only of the maximum possible humidity is contained in air. This percentage is called the relative humidity.

Relative humidity =

$$\left[ \frac{\text{Humidity content}}{\text{Max. possible humidity content (at saturation)}} \right] \times 100$$

## 4.3 Temperature Calculations

When considering condensation control, it is necessary to calculate the temperature of the internal wall or ceiling surface when the outside temperature is at the lowest level anticipated. The appropriate formulas are:

$$T_s = t_i - Q \times R_{si} \text{ thus } Q = (t_i - T_s)/R_{si}$$

$$Q = t_i - (Q/f_i)$$

$$Q = U (t_i - t_o)$$

Where,

$T_s$  = internal surface temperature ( $^{\circ}\text{C}$ )

$t_i$  = inside air temperature ( $^{\circ}\text{C}$ )

$t_o$  = outside air temperature ( $^{\circ}\text{C}$ )

$Q$  = calculated heat flow per square metre per second ( $\text{W}/\text{m}^2/\text{sec}$ )

$R_{si}$  = resistance on inside air film ( $\text{m}^2 \cdot ^{\circ}\text{K}/\text{W}$ )

$f_i$  = inside surface heat transfer coefficient ( $\text{W}/\text{m}^2 \cdot ^{\circ}\text{K}$ )

$U$  = Thermal Transmittance ( $\text{W}/^{\circ}\text{K} \cdot \text{m}^2$ )

If the internal surface temperature calculated in this manner is less than the anticipated dew point temperature, there is a risk of condensation forming on the surface. This can promote mould growth and the accumulation of dust and stains, and lead to the eventual breakdown of paint and paper finishes.

It is therefore recommended that sufficient building material thickness be added to raise the surface temperature of the wall or ceiling above the dew point. Under extremely cold conditions, the use of a vapour barrier should be considered. This is located immediately behind the facing sheet with the objective of preventing the migration of moisture vapour from within the living space into the wall and ceiling cavities.

If this happens the thermal resistance of the insulation can be seriously reduced and structural damage can result.

Table 5 can be used as a guide in establishing the lowest anticipated dew point temperature. It lists the dew point temperatures for a range of inside air temperatures and relative humidities.

**Table 5. Dew Point Temperatures (°C)**

Ambient Air Temperature (Dry Bulb) (°C)	Relative Humidity – R.H. (%)							
	20	30	40	50	60	70	80	90
5	-14.4	-9.9	-6.6	-4.0	-1.8	0.0	1.9	3.5
10	-10.5	-5.9	-2.5	0.1	2.7	4.8	6.7	8.4
15	-6.7	-2.0	1.7	4.8	7.4	9.7	11.6	13.4
20	-3.0	2.1	6.2	9.4	12.1	14.5	16.5	18.3
25	0.9	6.6	10.8	14.1	16.9	19.3	21.4	23.3
30	5.1	11.0	15.3	18.8	21.7	24.1	26.3	28.3
35	9.4	15.5	19.9	23.5	26.5	29.0	31.2	33.2
40	13.7	20.0	24.6	28.2	31.3	33.9	36.1	38.2

## 5.0 Examples of Condensation Calculations

Consider the case in Section 3 assuming winter conditions with an outside temperature of 0°C and an inside temperature of 22°C at 80% R.H.

$$U = 0.65 \text{ W/m}^2 \cdot ^\circ\text{K}$$

$$\begin{aligned} \text{Heat flow, } Q &= U (t_i - t_o) \\ &= 0.65 (22 - 0) \\ &= 14.3 \text{ W/m}^2 \end{aligned}$$

The rate of heat flow is constant through the wall and through each layer of resistance.

$$\text{Therefore } Q = (t_i - t_h)/R_{si}$$

$$\begin{aligned} \text{At the internal air layer } Q &= (22 - t_h)/0.09 \\ 14.3 &= (22 - t_h)/0.09 \end{aligned}$$

$$\begin{aligned} \text{Or } t_h &= 22 - (14.3 \times 0.09) \\ &= 20.73^\circ\text{C} \end{aligned}$$

From table above the dew point at 22°C & R.H. = 80% is approx 18.5°C (interpolating between 20 & 25°C).

The surface temperature being well above the dew point temperature from the table, condensation will not form on the surface of the wall.



# Supercrete™ Construction R Value Data Sheets

The following data sheets have been produced in response to the publication of the BRANZ book **House Insulation Guide** to give more accurate values for composite wall and floor systems taking into account the reduction in thermal resistance due to the timber or steel framing.

The figures given do not take into account wall & door openings and the R Values for these can be calculated separately using the WINDOW or THERM software.

For ease of comparison the form of the data sheets is similar to those in the BRANZ book **House Insulation Guide** and the figures have been calculated using the same methods as in the book i.e. based on NZS 4214: 2006 **Methods of Determining the Total Thermal Resistance of Parts of Building**.

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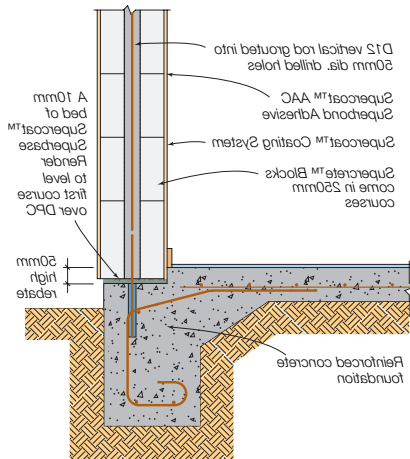
*NOTE. For the Wall Data Sheets a batten spacing of 600mm has been taken as a convenient mean figure for the purposes of calculation. The actual spacing may not be uniform but this will not affect the Construction R Value. The difference in Cavity Construction R Value between battens spaced at 400mm and 800mm is of the order 0.001 therefore the spacing of the battens is not going to have a great impact on the Construction R Value of the wall as a whole.*

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*NOTE. These sheets are to be read in conjunction with the 75mm Soundfloor Joist Charts on our website. The first 8 sheets above the line are best used for comparing R Values with other floor systems and for determining which combinations of joist spacing & insulation type comply with the requirements of the NZ Building Code. The sheets below the line are exact figures for various joist spacings and insulation types.*

## Supercrete™ 50mm Closed Cavity Veneer over 90mm Timber Fame



### Total Construction R Values for Supercrete™ 50mm Panel on 90mm Timber Frame

Framing Layout	Timber frame space Insulation Material R Value					
	1.8	2.0	2.2	2.4	2.6	2.8
Studs 600, dwangs 800 - 14% wall area	2.197	2.317	2.429	2.535	2.636	2.731
Studs 600, dwangs 600 - 16% wall area	2.165	2.276	2.380	2.477	2.569	2.656
Studs 400, dwangs 800 - 18% wall area	2.133	2.231	2.333	2.423	2.507	2.586
Studs 400, dwangs 600 - 20% wall area	2.103	2.199	2.289	2.372	2.449	2.521
22% wall area	2.074	2.164	2.247	2.323	2.394	2.460
24% wall area	2.046	2.130	2.207	2.278	2.343	2.403

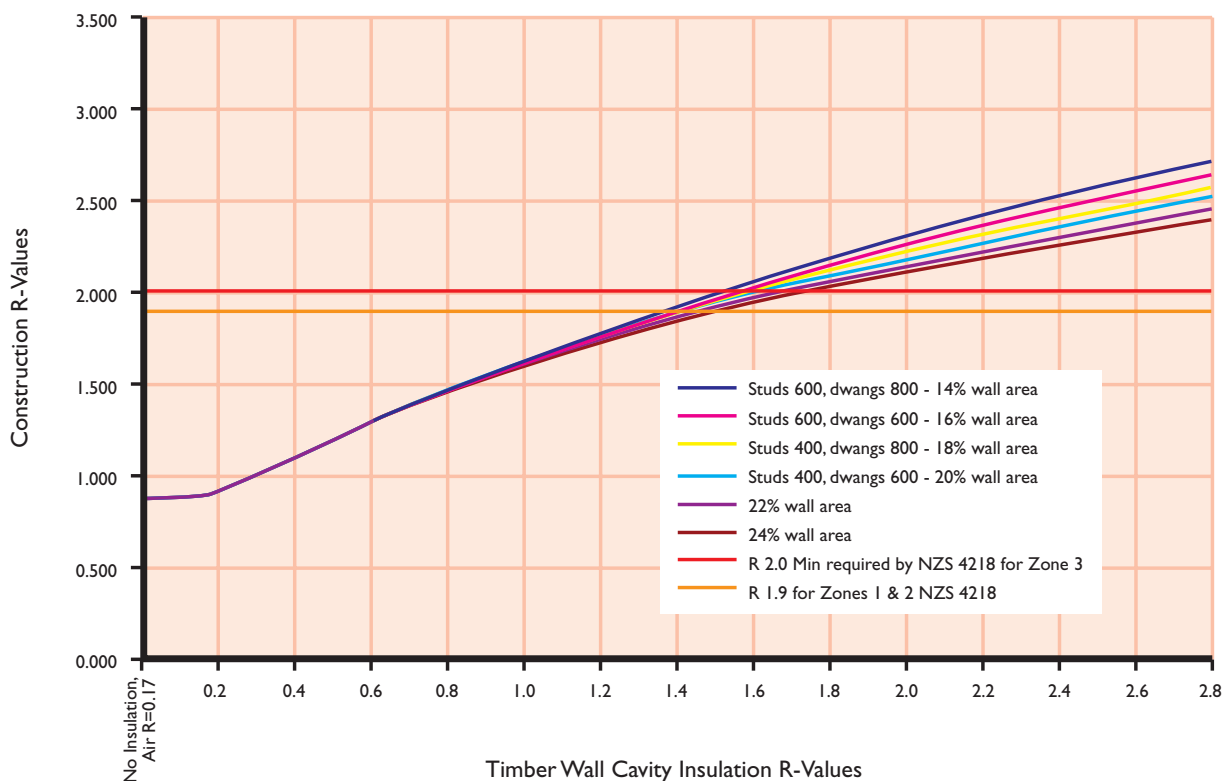
NOTE: A batten spacing of 600mm has been taken as a convenient mean figure for the purposes of calculation. The actual spacing may not be uniform but this will not affect the Construction R Value. The difference in Cavity Construction R Value between battens spaced at 400mm and 800mm is only 0.001, therefore, the spacing of the battens is not going to have a great impact on the Construction R Value of the wall as a whole.

These figures do not take into account values for windows and doors. These can be obtained using the **Window** or **Therm** software packages.

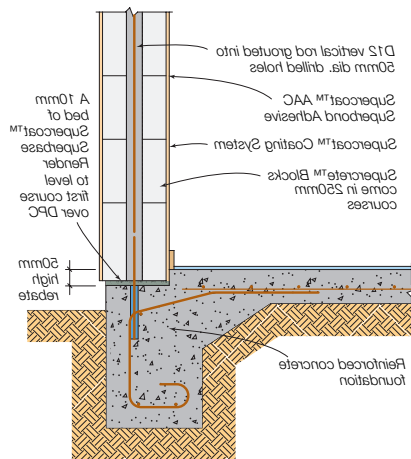
The Insulation Material RValues given are those regarded as the normal range for residential buildings. Other RValues below R1.8 can be obtained from the associated graph. R2.8 is the highest practicable RValue of common insulation materials that can be used with 90mm studs. The figures on this page are for ideal state materials; the actual installation conditions may reduce these figures.

## Construction R Values

## Supercrete™ 50mm Closed Cavity Veneer over 90mm Timber Frame



# Supercrete™ 75mm Closed Cavity Veneer over 90mm Timber Frame



## Total Construction R Values for Supercrete™ 75mm Panel on 90mm Timber Frame

Framing Layout	Timber frame space Insulation Material R Value					
	1.8	2.0	2.2	2.4	2.6	2.8
Studs 600, dwangs 800 - 14% wall area	2.337	2.457	2.569	2.675	2.776	2.871
Studs 600, dwangs 600 - 16% wall area	2.305	2.416	2.520	2.617	2.709	2.796
Studs 400, dwangs 800 - 18% wall area	2.273	2.371	2.473	2.563	2.647	2.726
Studs 400, dwangs 600 - 20% wall area	2.243	2.339	2.429	2.512	2.589	2.661
22% wall area	2.214	2.304	2.387	2.463	2.534	2.560
24% wall area	2.186	2.270	2.347	2.418	2.483	2.543

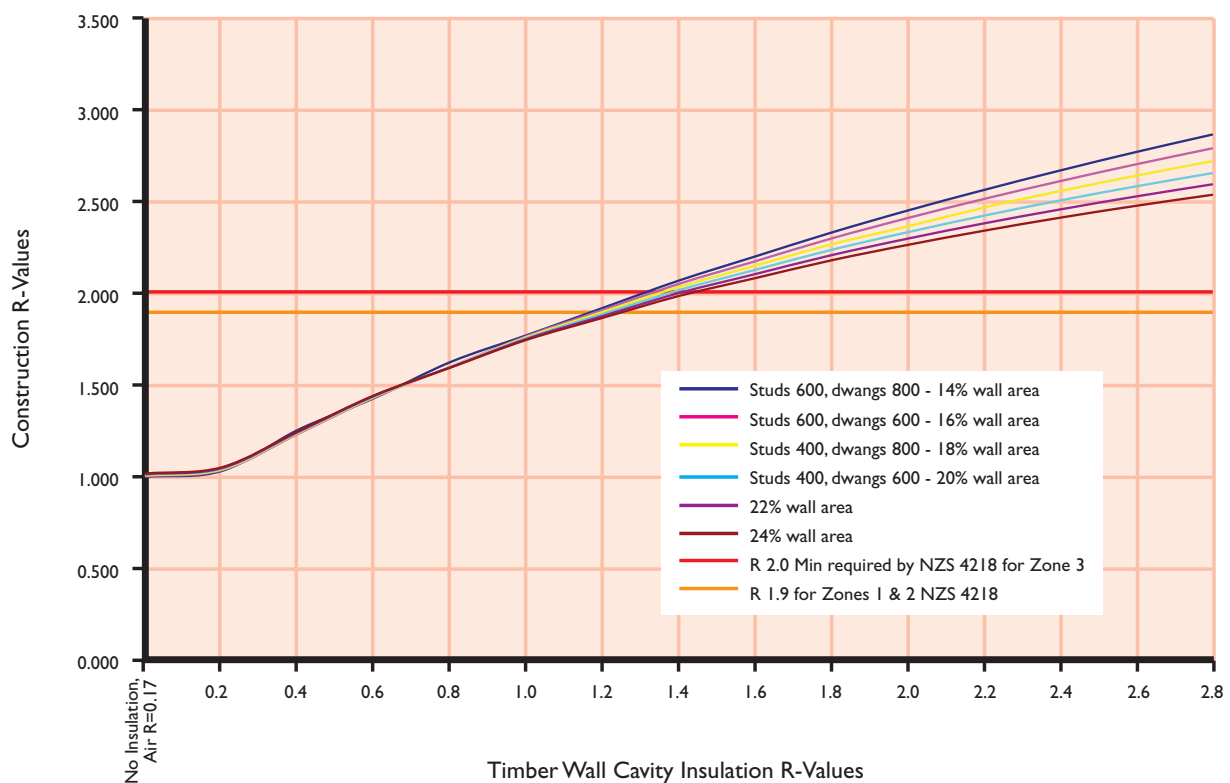
NOTE: A batten spacing of 600mm has been taken as a convenient mean figure for the purposes of calculation. The actual spacing may not be uniform but this will not affect the Construction R Value. The difference in Cavity Construction R Value between battens spaced at 400mm and 800mm is only 0.001, therefore, the spacing of the battens is not going to have a great impact on the Construction R Value of the wall as a whole.

These figures do not take into account values for windows and doors. These can be obtained using the **Window** or **Therm** software packages.

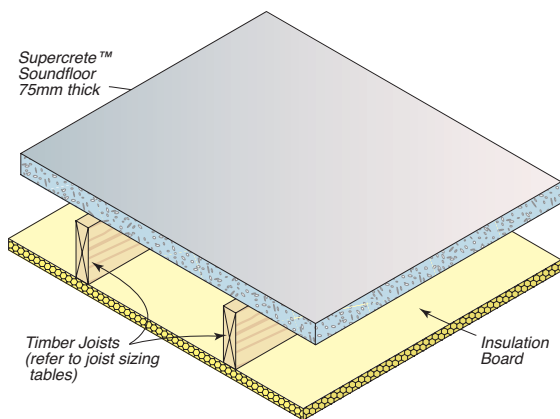
The Insulation Material R Values given are those regarded as the normal range for residential buildings. Other R Values below R1.8 can be obtained from the associated graph. R2.8 is the highest practicable R Value of common insulation materials that can be used with 90mm studs. The figures on this page are for ideal state materials; the actual installation conditions may reduce these figures.

## Construction R Values

### Supercrete™ 75mm Closed Cavity Veneer over 90mm Timber Frame



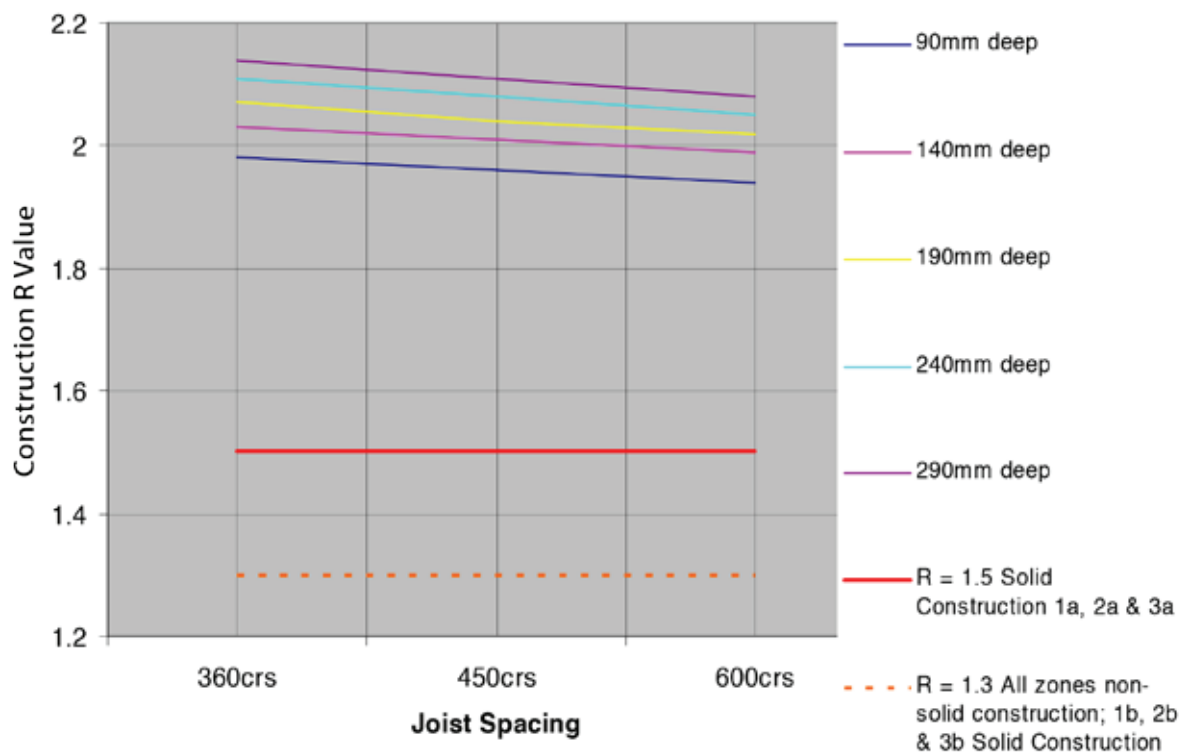
# Supercrete™ 75mm Soundfloor with Timber Joists & R1.3 Board



Joist Depth	Joist Spacing		
	360crs	450crs	600crs
90mm	1.98	1.96	1.94
140mm	2.03	2.01	1.99
190mm	2.07	2.04	2.02
240mm	2.11	2.08	2.05
290mm	2.14	2.11	2.08
Solid 1a, 2a & 3a	1.5	1.5	1.5
All non-solid; 1b, 2b & 3b solid	1.3	1.3	1.3

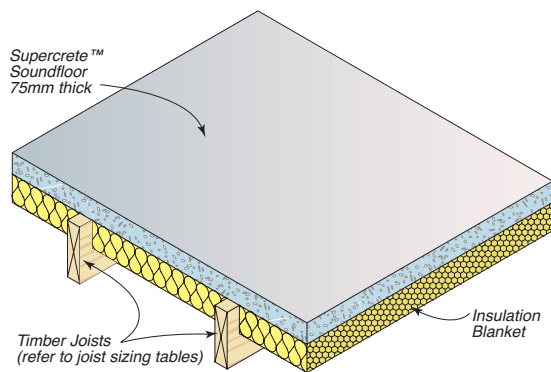
1. For open/exposed sub-floors. Add the RValues for ground under a suspended floor (see separate sheet) to the above figures
2. Add floor covering RValues to the above figures

## Construction R Values for Supercrete™ 75mm Soundfloor with Timber Joists & R1.3 Board



1. For open/exposed sub-floors. Add the RValues for ground under a suspended floor (see separate sheet) to the above figures
2. Add floor covering RValues to the above figures

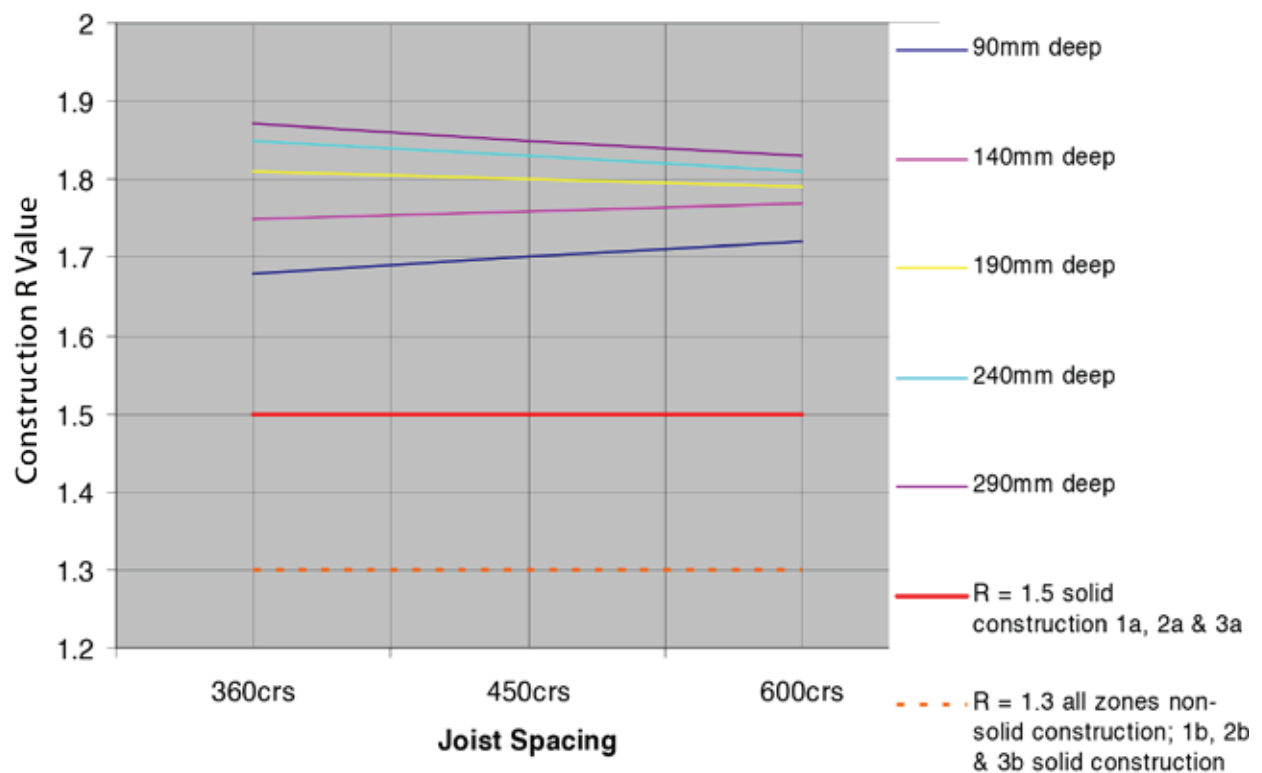
# Supercrete™ 75mm Soundfloor with Timber Joists & R1.3 blanket



Joist Depth	Joist Spacing		
	360crs	450crs	600crs
90mm	1.68	1.7	1.72
140mm	1.75	1.76	1.77
190mm	1.81	1.8	1.79
240mm	1.85	1.83	1.81
290mm	1.87	1.85	1.83
Solid 1a, 2a & 3a	1.5	1.5	1.5
All non-solid; 1b, 2b & 3b solid	1.3	1.3	1.3

1. For open/exposed sub-floors. Add the RValues for ground under a suspended floor (see separate sheet) to the above figures
2. Add floor covering RValues to the above figures

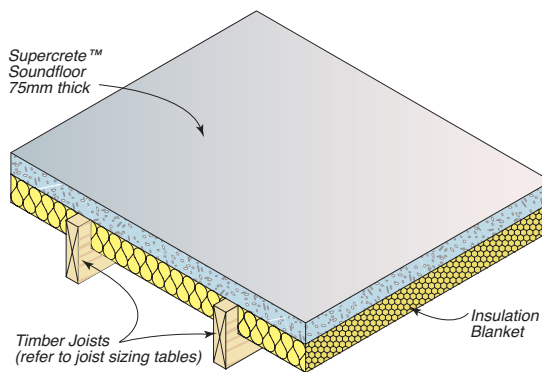
## Construction R Values for Supercrete™ 75mm Soundfloor with Timber Joists & R1.3 Blanket



1. For open/exposed sub-floors. Add the RValues for ground under a suspended floor (see separate sheet) to the above figures
2. Add floor covering RValues to the above figures



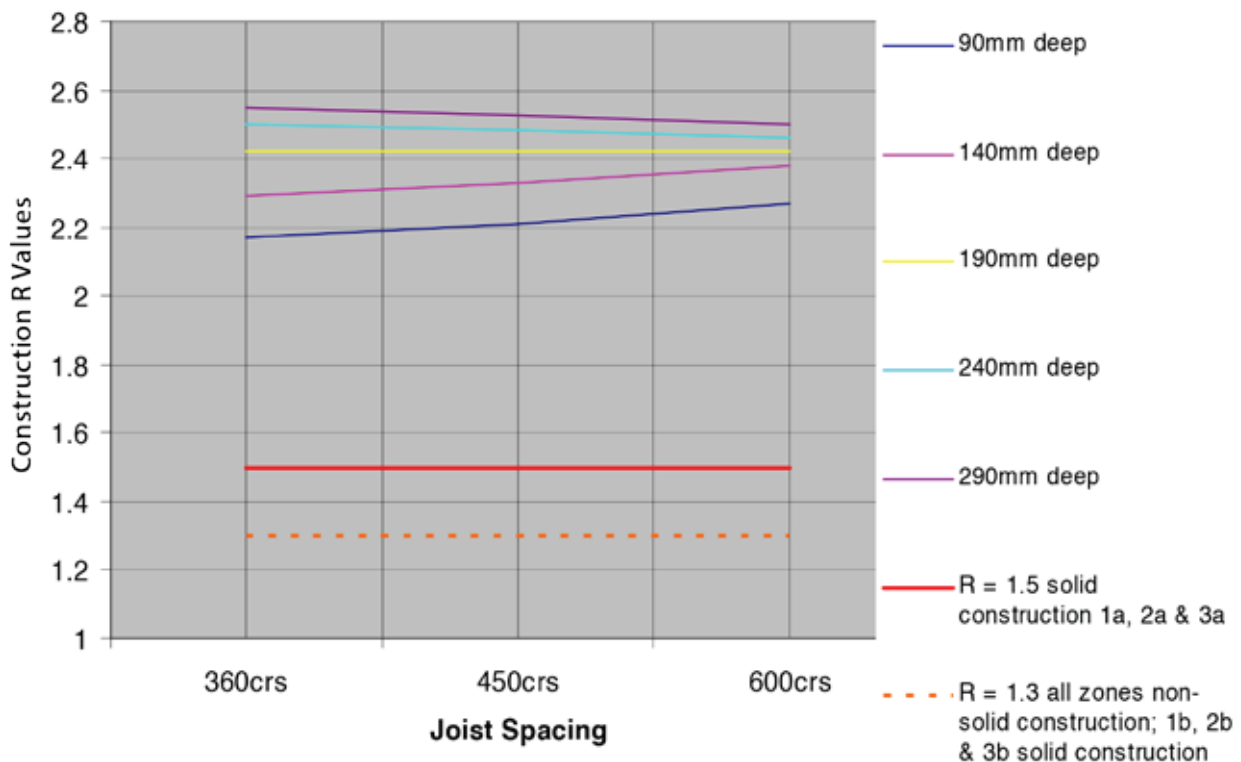
# Supercrete™ 75mm Soundfloor with Timber Joists & R2.0 Blanket



Joist Depth	Joist Spacing		
	360crs	450crs	600crs
90mm	2.17	2.21	2.27
140mm	2.29	2.33	2.38
190mm	2.42	2.42	2.42
240mm	2.5	2.48	2.46
290mm	2.55	2.53	2.5
Solid 1a, 2a & 3a	1.5	1.5	1.5
All non-solid; 1b, 2b & 3b solid	1.3	1.3	1.3

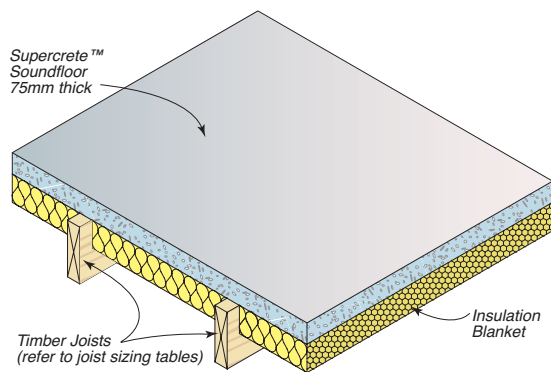
1. For open/exposed sub-floors. Add the RValues for ground under a suspended floor (see separate sheet) to the above figures
2. Add floor covering RValues to the above figures

## Construction R Values for Supercrete™ 75mm Soundfloor with Timber Joists & R2.0 Blanket



1. For open/exposed sub-floors. Add the RValues for ground under a suspended floor (see separate sheet) to the above figures
2. Add floor covering RValues to the above figures

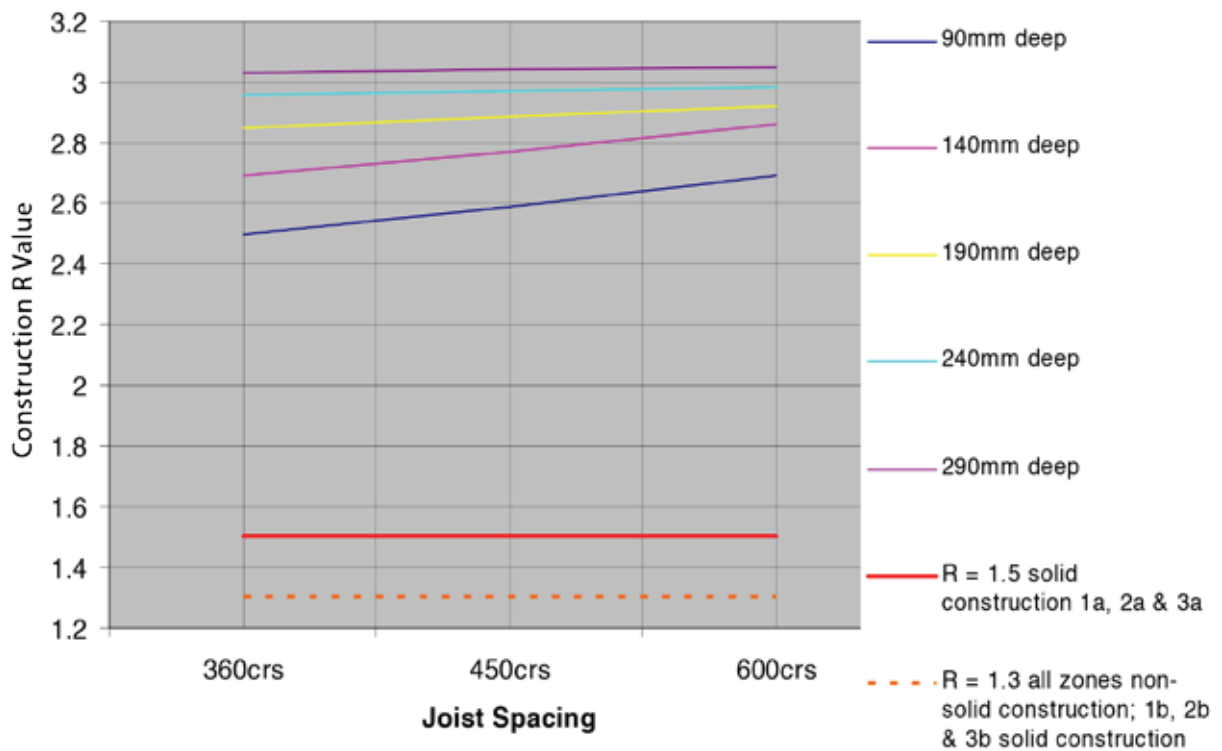
# Supercrete™ 75mm Soundfloor with Timber Joists & R2.6 Blanket



Joist Depth	Joist Spacing		
	360crs	450crs	600crs
90mm	2.5	2.59	2.69
140mm	2.69	2.77	2.86
190mm	2.85	2.89	2.92
240mm	2.96	2.97	2.98
290mm	3.03	3.04	3.05
Solid 1a, 2a & 3a	1.5	1.5	1.5
All non-solid; 1b, 2b & 3b solid	1.3	1.3	1.3

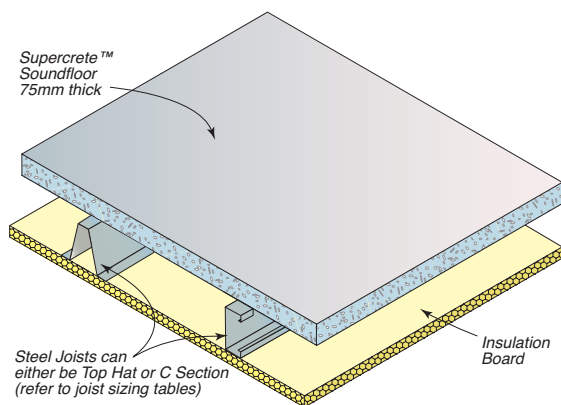
1. For open/exposed sub-floors. Add the RValues for ground under a suspended floor (see separate sheet) to the above figures
2. Add floor covering RValues to the above figures

## Construction R Values for Supercrete™ 75mm Soundfloor with Timber Joists & R2.6 Blanket



1. For open/exposed sub-floors. Add the RValues for ground under a suspended floor (see separate sheet) to the above figures
2. Add floor covering RValues to the above figures

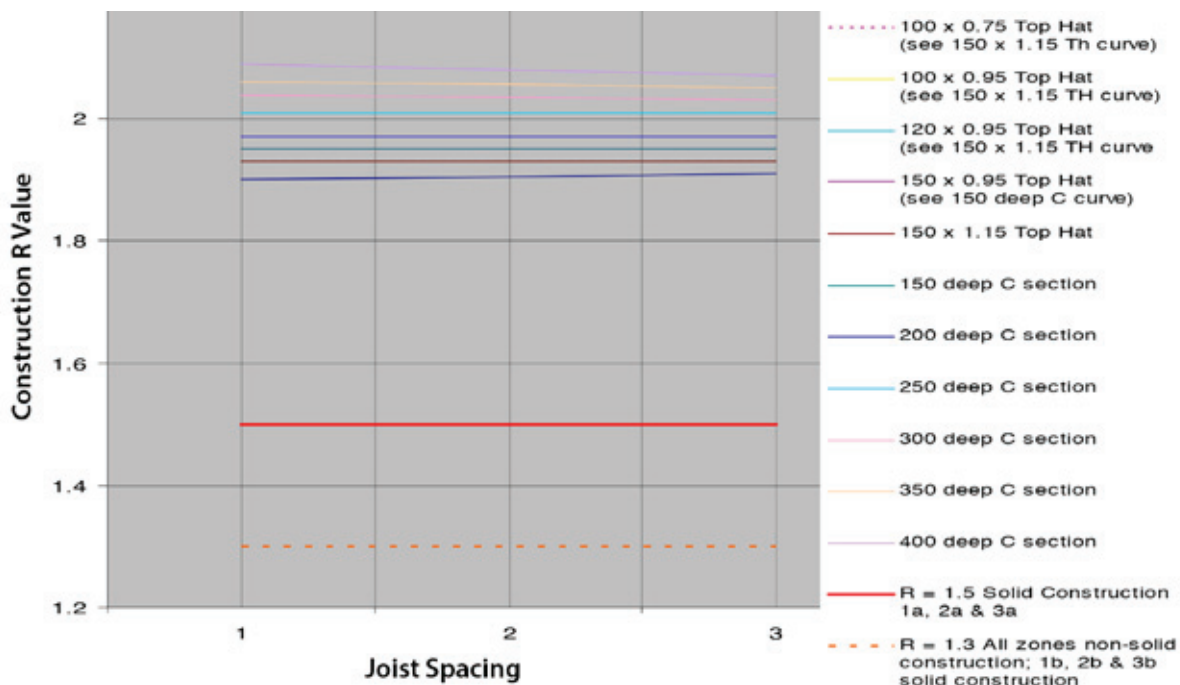
# Supercrete™ 75mm Soundfloor with Steel Joists & R1.3 Board



Joist Depth	Joist Spacing		
	360crs	450crs	600crs
60x0.95 TH	1.9	1.905	1.91
100x0.75TH	1.93	1.93	1.93
100x0.95TH	1.93	1.93	1.93
120x0.95TH	1.93	1.93	1.93
150x0.95TH	1.95	1.95	1.95
150x1.15TH	1.93	1.93	1.93
150 deep C	1.95	1.95	1.95
200 deep C	1.97	1.97	1.97
250 deep C	2.01	2.01	2.01
300 deep C	2.04	2.035	2.03
350 deep C	2.06	2.055	2.05
400 deep C	2.09	2.08	2.07
Solid 1a, 2a & 3a	1.5	1.5	1.5
All non-solid; 1b, 2b & 3b solid	1.3	1.3	1.3

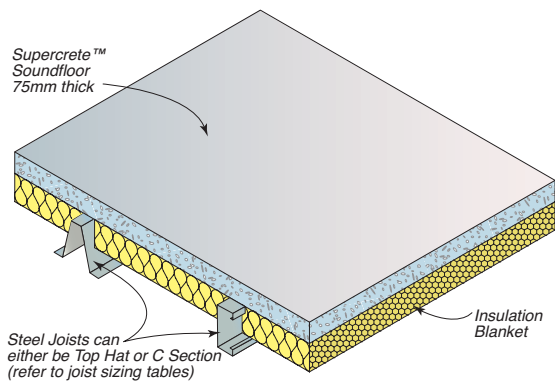
1. For open/exposed sub-floors. Add the RValues for ground under a suspended floor (see separate sheet) to the above figures
2. Add floor covering RValues to the above figures

## Construction R Values for Supercrete™ 75mm Soundfloor with Steel Joists & R1.3 Board



1. For open/exposed sub-floors. Add the RValues for ground under a suspended floor (see separate sheet) to the above figures
2. Add floor covering RValues to the above figures

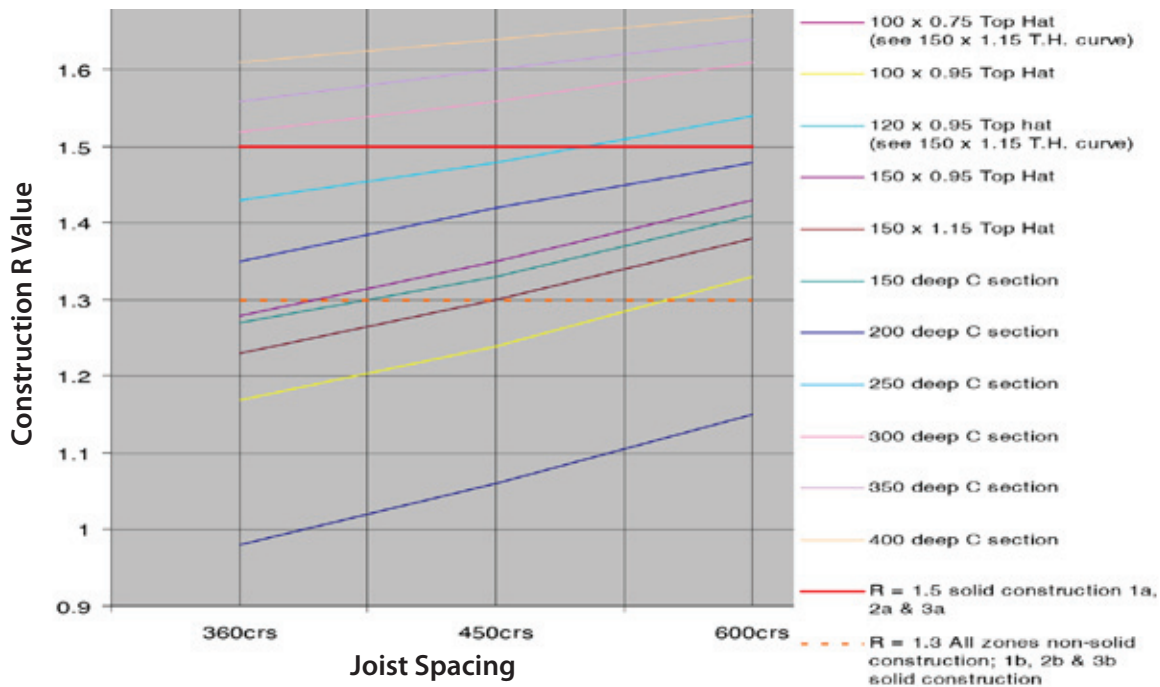
# Supercrete™ 75mm Soundfloor with Steel Joists & R1.3 Blanket



Joist Depth	Joist Spacing		
	360crs	450crs	600crs
60x0.95 TH	0.98	1.06	1.15
100x0.75TH	1.23	1.3	1.38
100x0.95TH	1.17	1.24	1.33
120x0.95TH	1.23	1.3	1.38
150x0.95TH	1.28	1.35	1.43
150x1.15TH	1.23	1.3	1.38
150 deep C	1.27	1.33	1.41
200 deep C	1.35	1.42	1.48
250 deep C	1.43	1.48	1.54
300 deep C	1.52	1.56	1.61
350 deep C	1.56	1.6	1.64
400 deep C	1.61	1.64	1.67
Solid 1a, 2a & 3a	1.5	1.5	1.5
All non-solid; 1b, 2b & 3b solid	1.3	1.3	1.3

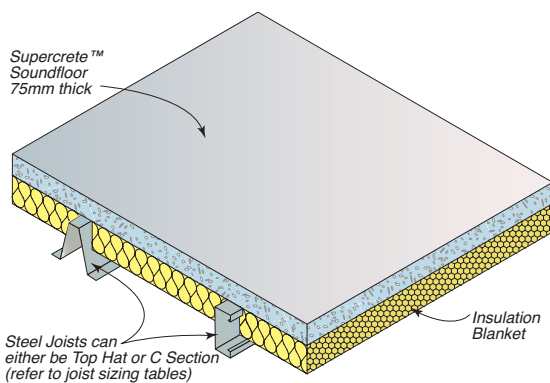
1. For open/exposed sub-floors. Add the RValues for ground under a suspended floor (see separate sheet) to the above figures
2. Add floor covering RValues to the above figures

## Construction R Values for Supercrete™ 75mm Soundfloor with Steel Joists & R1.3 Blanket



1. For open/exposed sub-floors. Add the RValues for ground under a suspended floor (see separate sheet) to the above figures
2. Add floor covering RValues to the above figures

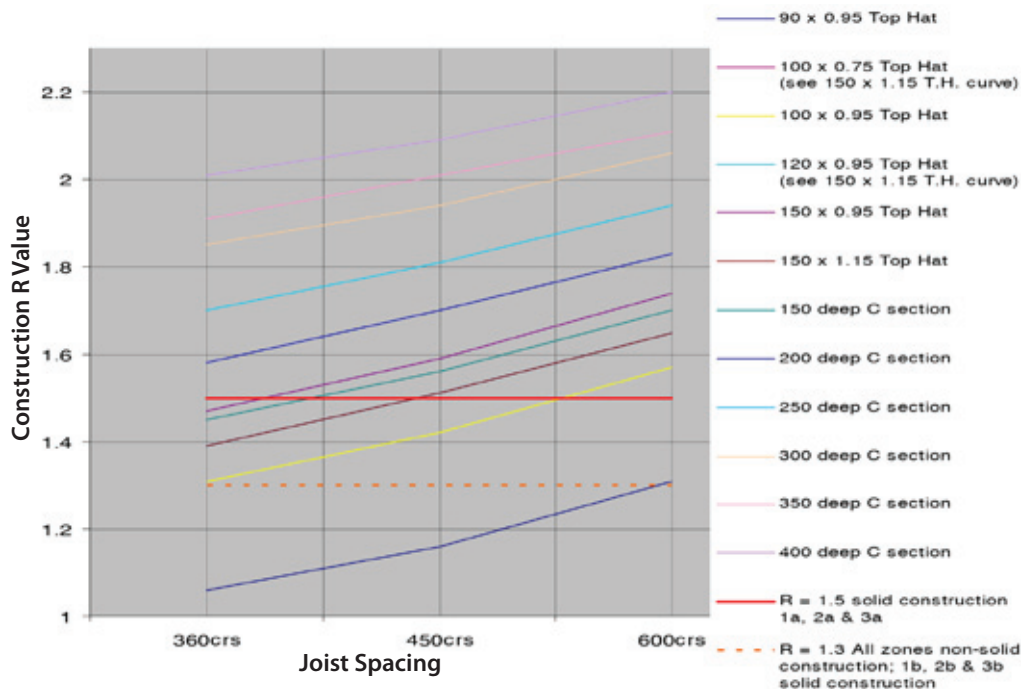
# Supercrete™ 75mm Soundfloor with Steel Joists & R2.0 Blanket



Joist Depth	Joist Spacing		
	360crs	450crs	600crs
60x.95 TH	1.06	1.16	1.31
100x.75TH	1.39	1.51	1.65
100x.95TH	1.31	1.42	1.57
120x.95TH	1.39	1.51	1.65
150x.95TH	1.47	1.59	1.74
150x1.15TH	1.39	1.51	1.65
150mm C	1.45	1.56	1.7
200mm C	1.58	1.7	1.83
250mm C	1.7	1.81	1.94
300mm C	1.85	1.94	2.06
350mm C	1.91	2.01	2.11
400mm C	2.01	2.09	2.2
Solid 1a, 2a & 3a	1.5	1.5	1.5
All non-solid; 1b, 2b & 3b solid	1.3	1.3	1.3

1. For open/exposed sub-floors. Add the RValues for ground under a suspended floor (see separate sheet) to the above figures
2. Add floor covering RValues to the above figures

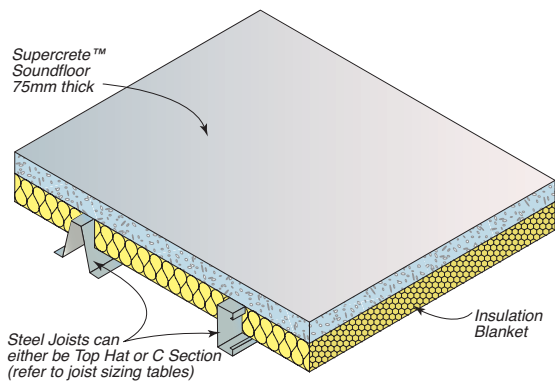
## Construction R Values for Supercrete™ 75mm Soundfloor with Steel Joists & R2.0 Blanket



1. For open/exposed sub-floors. Add the RValues for ground under a suspended floor (see separate sheet) to the above figures
2. Add floor covering RValues to the above figures



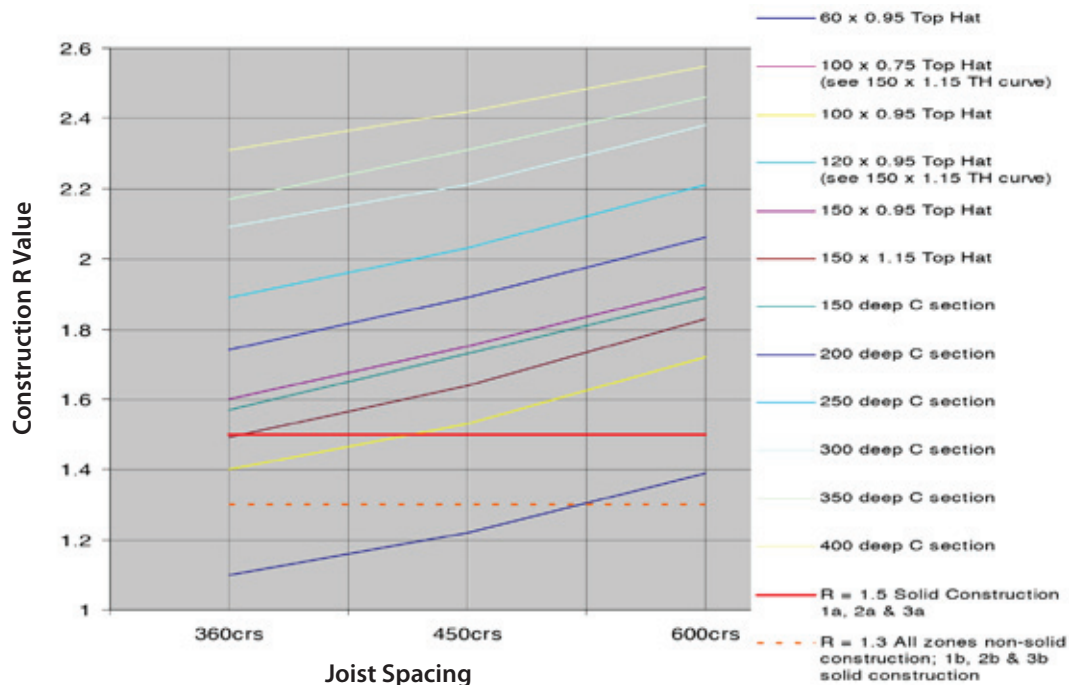
# Supercrete™ 75mm Soundfloor with Steel Joists & R2.6 Blanket



Joist Depth	Joist Spacing		
	360crs	450crs	600crs
60x.95 TH	1.1	1.22	1.39
100x.75TH	1.49	1.64	1.83
100x.95TH	1.4	1.53	1.72
120x.95TH	1.49	1.64	1.83
150x.95TH	1.6	1.75	1.92
150x1.15TH	1.49	1.64	1.83
150mm C	1.57	1.73	1.89
200mm C	1.74	1.89	2.06
250mm C	1.89	2.03	2.21
300mm C	2.09	2.21	2.38
350mm C	2.17	2.31	2.46
400mm C	2.31	2.42	2.55
Solid 1a, 2a & 3a	1.5	1.5	1.5
All non-solid; 1b, 2b & 3b solid	1.3	1.3	1.3

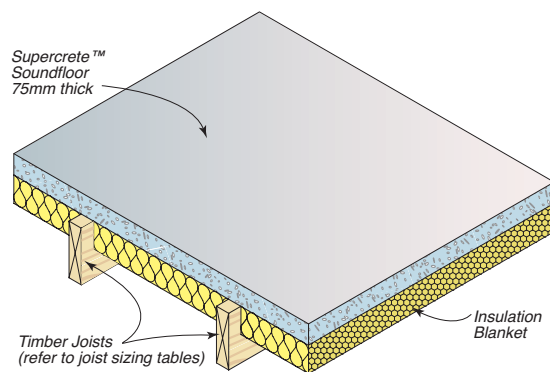
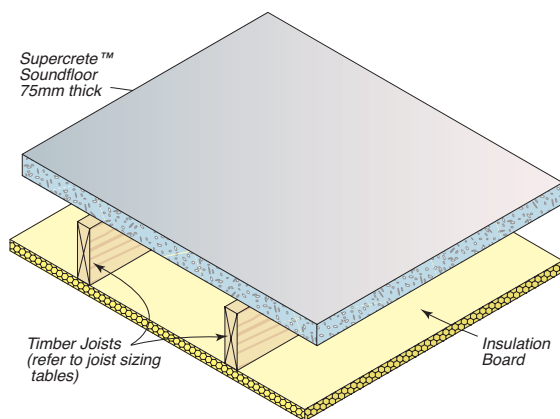
1. For open/exposed sub-floors. Add the RValues for ground under a suspended floor (see separate sheet) to the above figures
2. Add floor covering RValues to the above figures

## Construction R Values for Supercrete™ 75mm Soundfloor with Steel Joists & R2.6 Blanket



1. For open/exposed sub-floors. Add the RValues for ground under a suspended floor (see separate sheet) to the above figures
2. Add floor covering RValues to the above figures

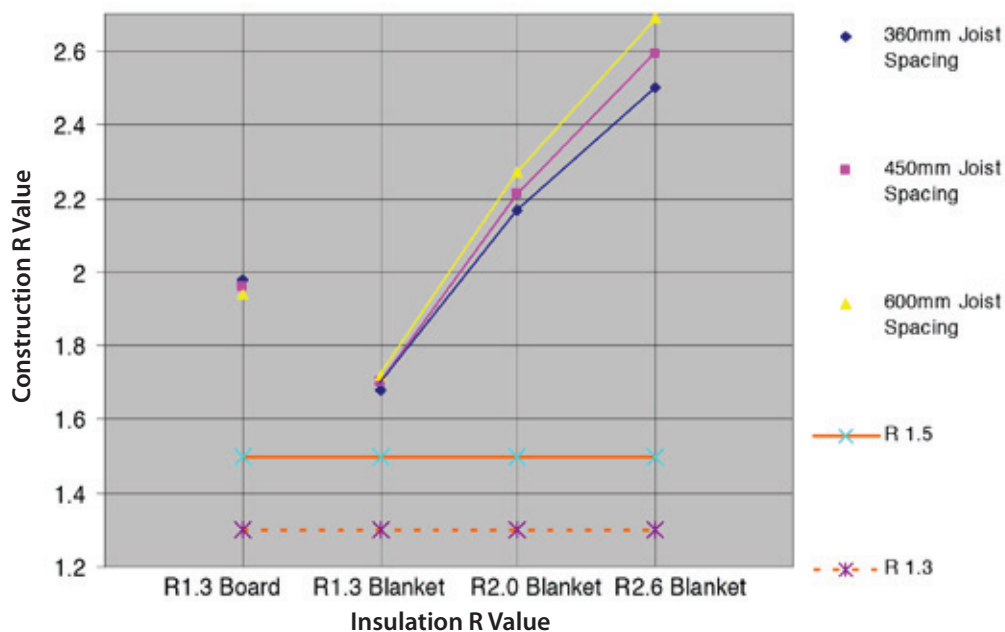
# Supercrete™ 75mm Soundfloor with 90mm Deep Timber Joists



Joist Spacing	Insulation				
	None	R1.3 Board	R1.3 blanket	R2.0 blanket	R2.6 blanket
360mm	0.58	1.98	1.68	2.17	2.5
450mm	0.57	1.96	1.7	2.21	2.59
600mm	0.56	1.94	1.72	2.27	2.69
Solid 1a, 2a & 3a	1.5	1.5	1.5	1.5	1.5
All non-solid; 1b, 2b & 3b solid	1.3	1.3	1.3	1.3	1.3

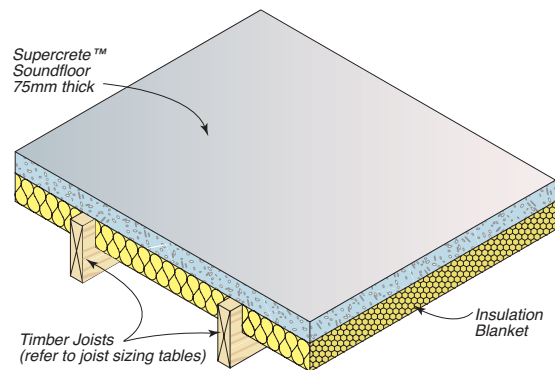
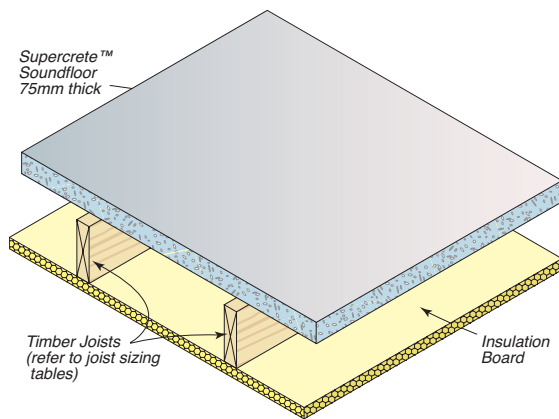
1. For open/exposed sub-floors. Add the R Values for ground under a suspended floor (see separate sheet) to the above figures
2. Add floor covering R Values to the above figures

## Construction R Values for Supercrete™ 75mm Soundfloor with 90mm deep Timber Joists



1. For open/exposed sub-floors. Add the R Values for ground under a suspended floor (see separate sheet) to the above figures
2. Add floor covering R Values to the above figures
3. Line R 1.5 is NZBC minimum required for Solid Construction (excluding solid timber) for Zones 1a, 2a & 3a
4. Line R 1.3 is NZBC minimum required for Non-solid Construction for all Zones & Zones 1b, 2b & 3b for Solid Construction (excluding solid timber)

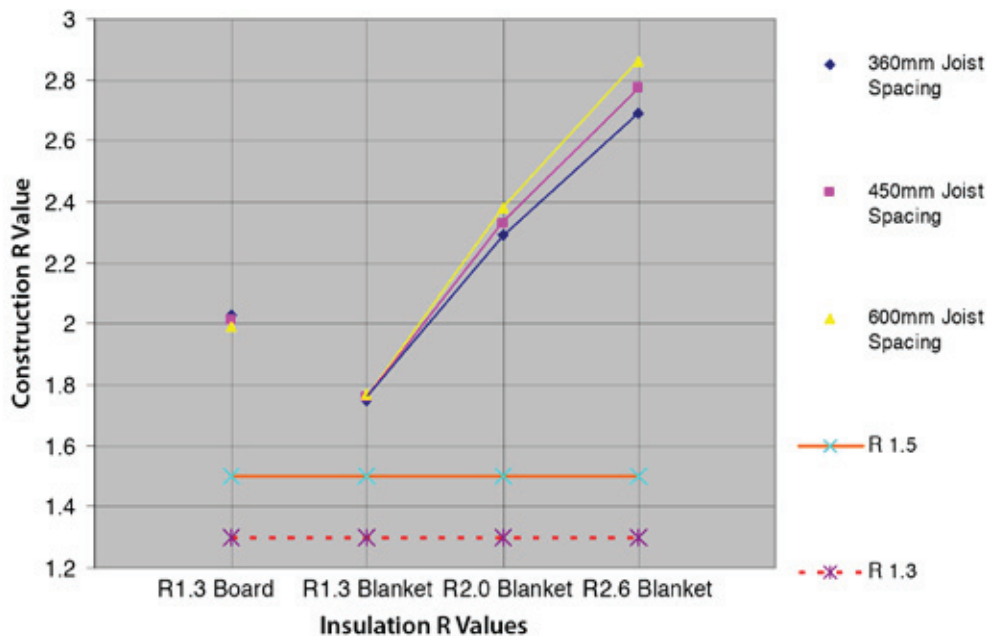
# Supercrete™ 75mm Soundfloor with 140mm Deep Timber Joists



Joist Spacing	Insulation				
	None	R1.3 Board	R1.3 blanket	R2.0 blanket	R2.6 blanket
360mm	0.58	2.03	1.75	2.29	2.69
450mm	0.57	2.01	1.76	2.33	2.77
600mm	0.56	1.99	1.77	2.38	2.86
Solid 1a, 2a & 3a	1.5	1.5	1.5	1.5	1.5
All non-solid; 1b, 2b & 3b solid	1.3	1.3	1.3	1.3	1.3

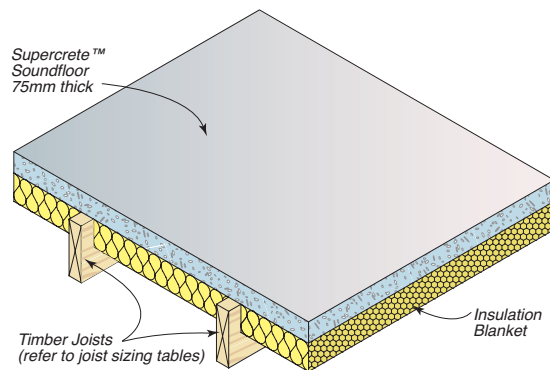
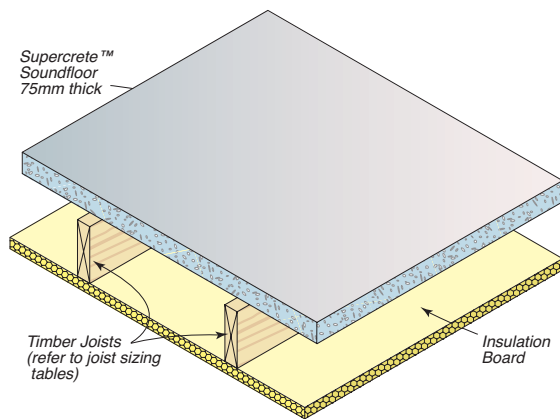
1. For open/exposed sub-floors. Add the RValues for ground under a suspended floor (see page 84 BRANZ House Insulation Guide) to the above figures
2. Add floor covering RValues to the above figures

## Construction R Values for Supercrete™ 75mm Soundfloor with 140mm deep Timber Joists



1. For open/exposed sub-floors. Add the RValues for ground under a suspended floor (see separate sheet) to the above figures
2. Add floor covering RValues to the above figures
3. Line R 1.5 is NZBC minimum required for Solid Construction (excluding solid timber) for Zones 1a, 2a & 3a
4. Line R 1.3 is NZBC minimum required for Non-solid Construction for all Zones & Zones 1b, 2b & 3b for Solid Construction (excluding solid timber)

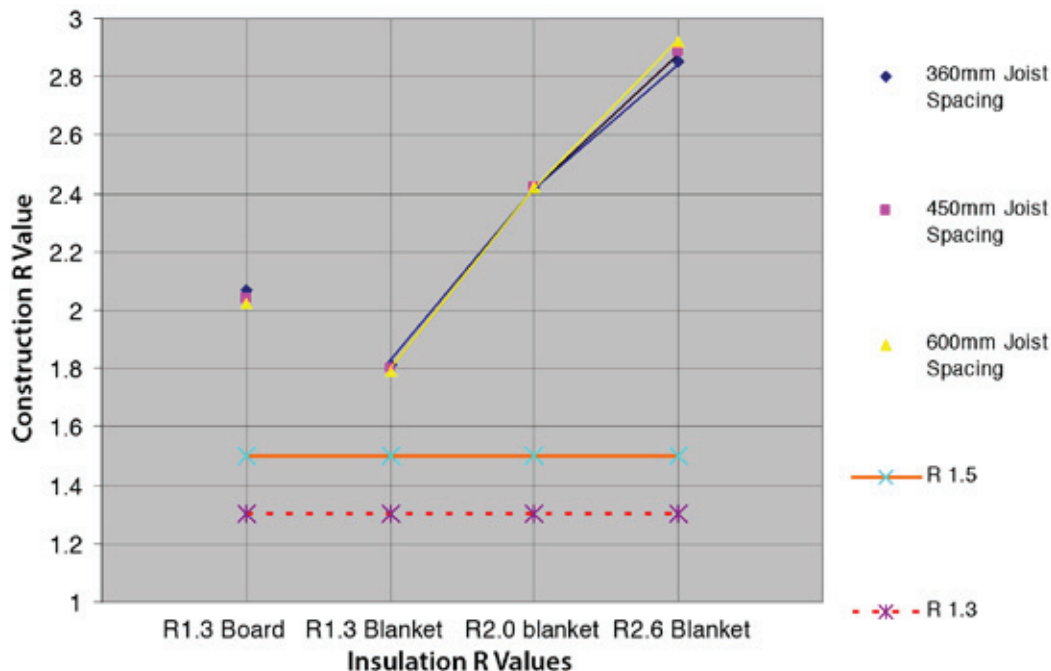
# Supercrete™ 75mm Soundfloor with 190mm Deep Timber Joists



Joist Spacing	Insulation				
	None	R1.3 Board	R1.3 blanket	R2.0 blanket	R2.6 blanket
360mm	0.59	2.07	1.81	2.42	2.85
450mm	0.58	2.04	1.8	2.42	2.885
600mm	0.57	2.02	1.79	2.42	2.92
Solid 1a, 2a & 3a	1.5	1.5	1.5	1.5	1.5
All non-solid; 1b, 2b & 3b solid	1.3	1.3	1.3	1.3	1.3

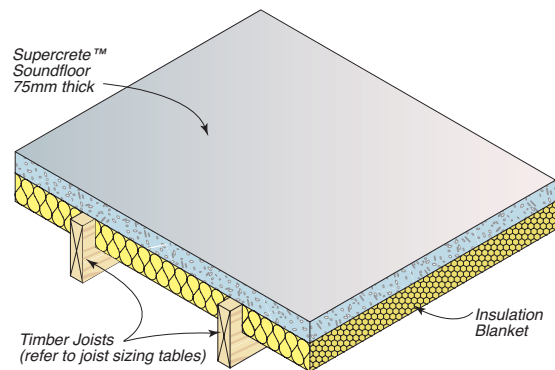
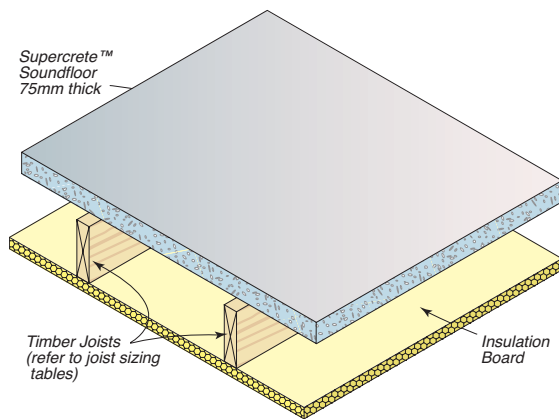
1. For open/exposed sub-floors. Add the R Values for ground under a suspended floor (see page 84 BRANZ House Insulation Guide) to the above figures
2. Add floor covering R Values to the above figures

## Construction R Values for Supercrete™ 75mm Soundfloor with 190mm deep Timber Joists



1. For open/exposed sub-floors. Add the R Values for ground under a suspended floor (see separate sheet) to the above figures
2. Add floor covering R Values to the above figures
3. Line R 1.5 is NZBC minimum required for Solid Construction (excluding solid timber) for Zones 1a, 2a & 3a
4. Line R 1.3 is NZBC minimum required for Non-solid Construction for all Zones & Zones 1b, 2b & 3b for Solid Construction (excluding solid timber)

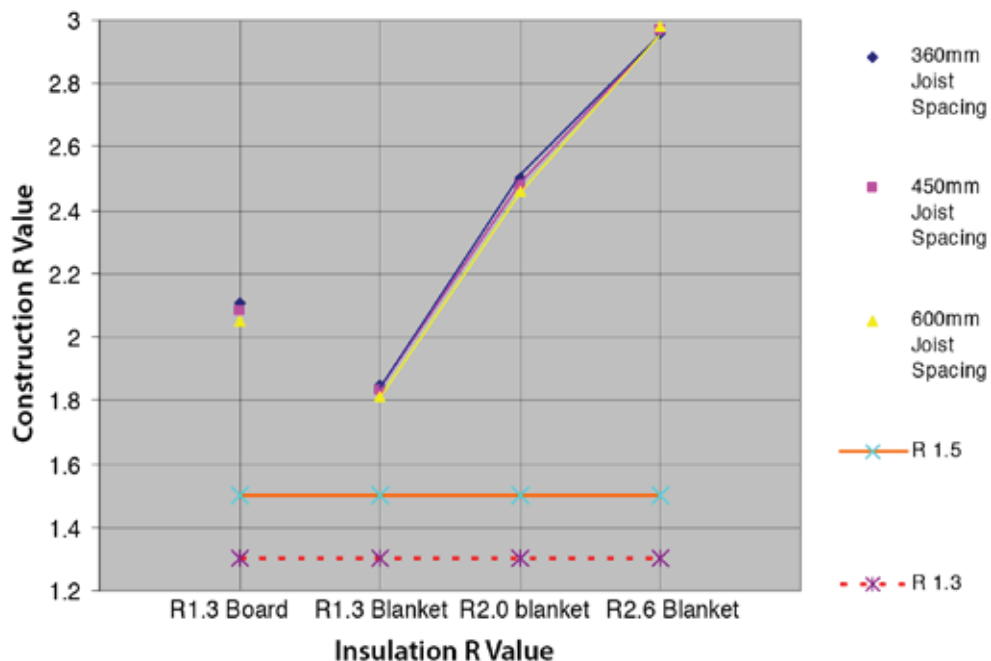
# Supercrete™ 75mm Soundfloor with 240mm Deep Timber Joists



Joist Spacing	Insulation				
	None	R1.3 Board	R1.3 blanket	R2.0 blanket	R2.6 blanket
360mm	0.59	2.11	1.85	2.5	2.96
450mm	0.58	2.08	1.83	2.48	2.97
600mm	0.57	2.05	1.81	2.46	2.98
Solid 1a, 2a & 3a	1.5	1.5	1.5	1.5	1.5
All non-solid; 1b, 2b & 3b solid	1.3	1.3	1.3	1.3	1.3

1. For open/exposed sub-floors. Add the R Values for ground under a suspended floor (see page 84 BRANZ House Insulation Guide) to the above figures
2. Add floor covering R Values to the above figures

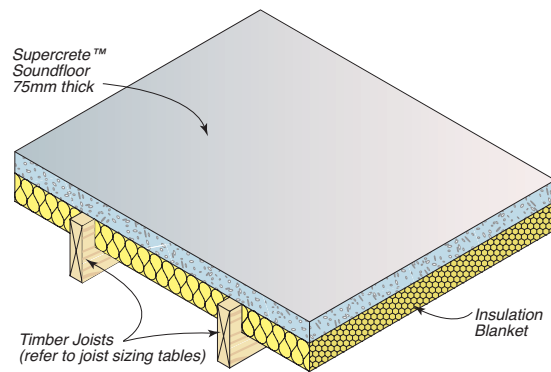
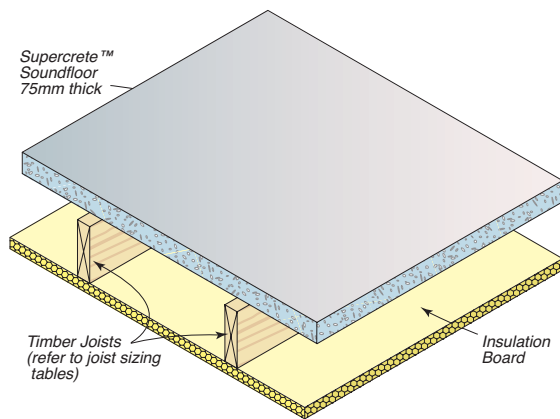
## Construction R Values for Supercrete™ 75mm Soundfloor with 240mm deep Timber Joists



1. For open/exposed sub-floors. Add the R Values for ground under a suspended floor (see separate sheet) to the above figures
2. Add floor covering R Values to the above figures
3. Line R 1.5 is NZBC minimum required for Solid Construction (excluding solid timber) for Zones 1a, 2a & 3a
4. Line R 1.3 is NZBC minimum required for Non-solid Construction for all Zones & Zones 1b, 2b & 3b for Solid Construction (excluding solid timber)



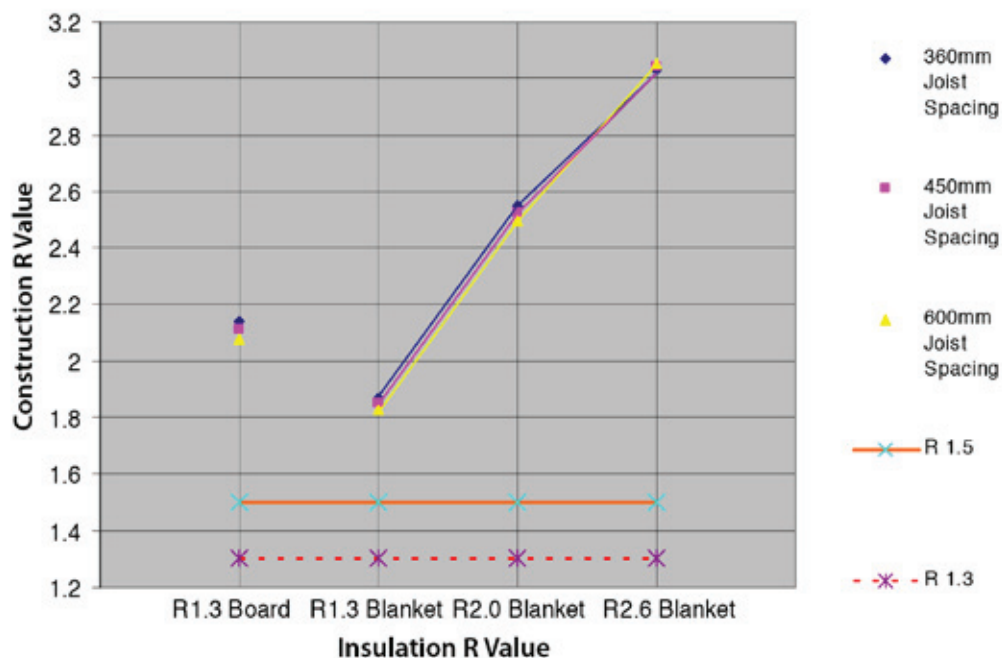
# Supercrete™ 75mm Soundfloor with 290mm Deep Timber Joists



Joist Spacing	Insulation				
	None	R1.3 Board	R1.3 blanket	R2.0 blanket	R2.6 blanket
360mm	0.59	2.14	1.87	2.55	3.03
450mm	0.58	2.11	1.85	2.525	3.04
600mm	0.57	2.08	1.83	2.5	3.05
Solid 1a, 2a & 3a	1.5	1.5	1.5	1.5	1.5
All non-solid; 1b, 2b & 3b solid	1.3	1.3	1.3	1.3	1.3

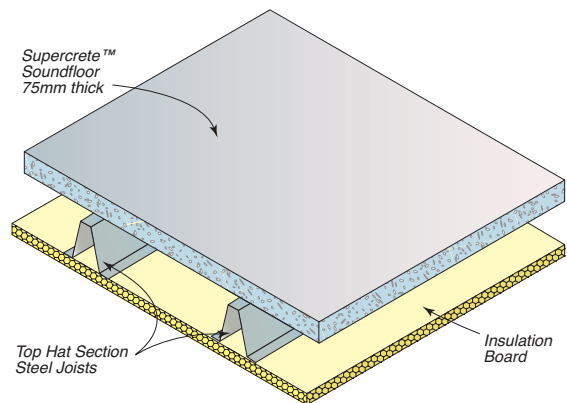
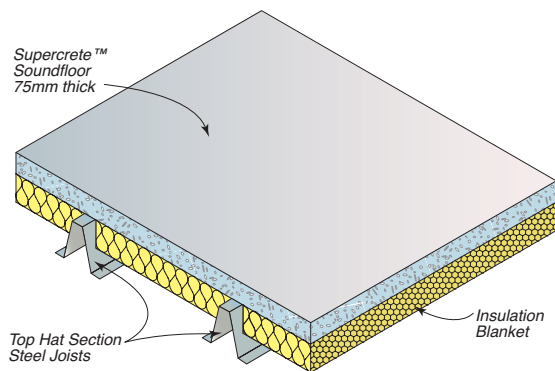
1. For open/exposed sub-floors. Add the R Values for ground under a suspended floor (see page 84 BRANZ House Insulation Guide) to the above figures
2. Add floor covering R Values to the above figures

## Construction R Values for Supercrete™ 75mm Soundfloor with 290mm deep Timber Joists



1. For open/exposed sub-floors. Add the R Values for ground under a suspended floor (see separate sheet) to the above figures
2. Add floor covering R Values to the above figures
3. Line R 1.5 is NZBC minimum required for Solid Construction (excluding solid timber) for Zones 1a, 2a & 3a
4. Line R 1.3 is NZBC minimum required for Non-solid Construction for all Zones & Zones 1b, 2b & 3b for Solid Construction (excluding solid timber)

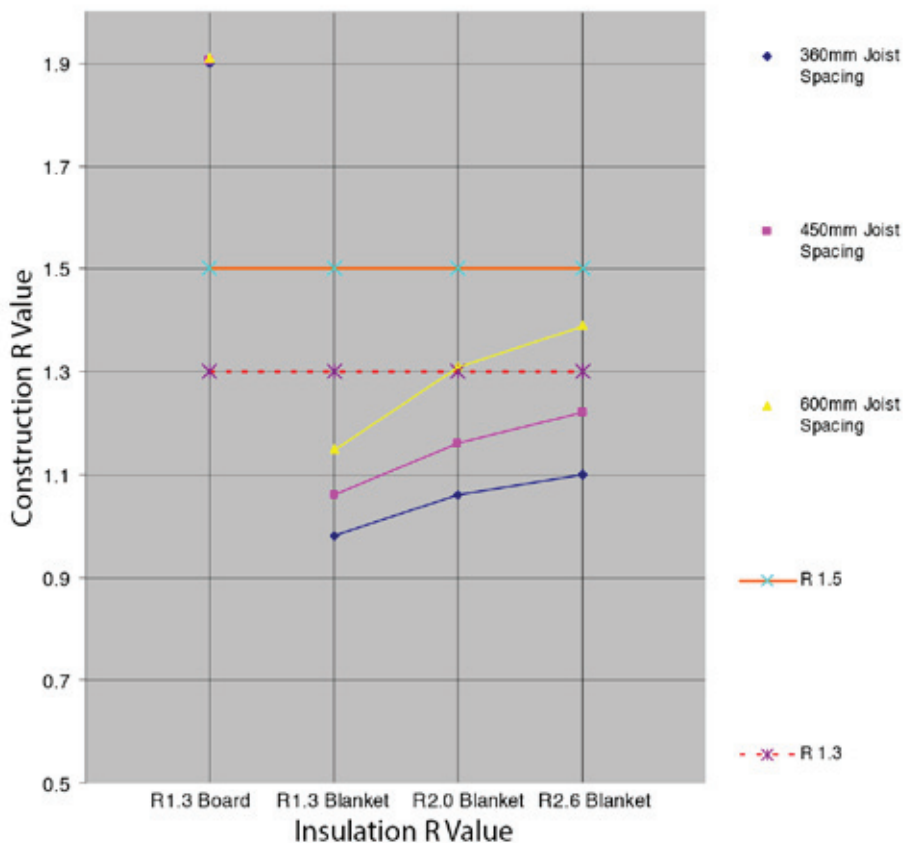
# Supercrete™ 75mm Soundfloor with 60 x 0.95BMT Tophat Joists



Joist Spacing	Insulation			
	R1.3 Board	R1.3 blanket	R2.0 blanket	R2.6 blanket
360mm	1.9	0.98	1.06	1.1
450mm	1.905	1.06	1.16	1.22
600mm	1.91	1.15	1.31	1.39
Solid 1a, 2a & 3a	1.5	1.5	1.5	1.5
All non-solid; 1b, 2b & 3b solid	1.3	1.3	1.3	1.3

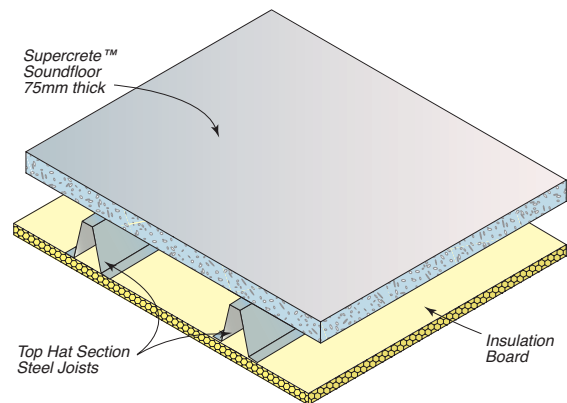
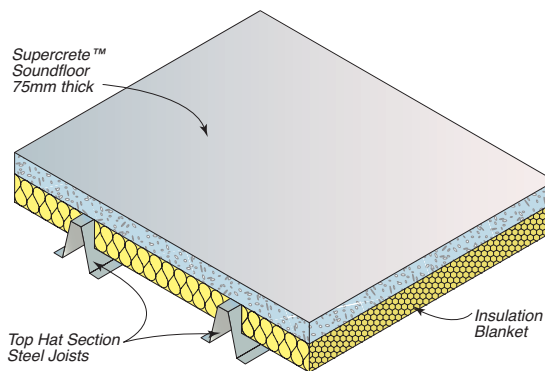
1. For open/exposed sub-floors. Add the RValues for ground under a suspended floor (see separate sheet) to the above figures
2. Add floor covering RValues to the above figures

## Construction R Values for Supercrete™ 75mm Soundfloor with 60 x 0.95thk Top Hat Steel Joists



1. For open/exposed sub-floors. Add the RValues for ground under a suspended floor (see separate sheet) to the above figures
2. Add floor covering RValues to the above figures
3. Line R 1.5 is NZBC minimum required for Solid Construction (excluding solid timber) for Zones 1a, 2a & 3a
4. Line R 1.3 is NZBC minimum required for Non-solid Construction for all Zones & Zones 1b, 2b & 3b for Solid Construction (excluding solid timber)

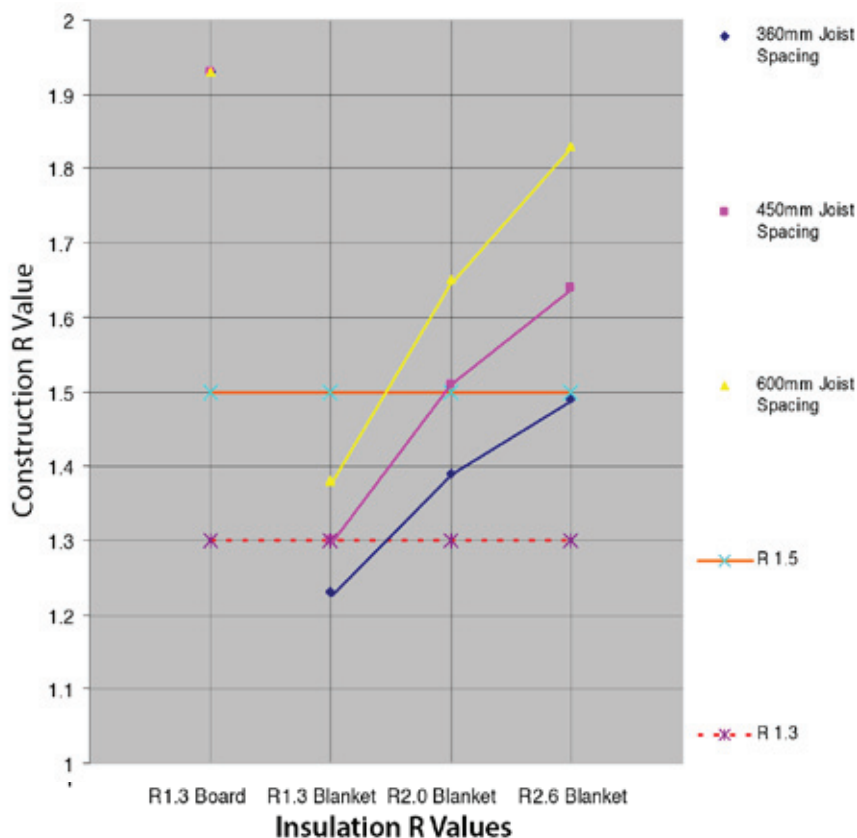
# Supercrete™ 75mm Soundfloor with 100 x 0.75BMT Tophat Joists



Joist Spacing	Insulation			
	R1.3 Board	R1.3 blanket	R2.0 blanket	R2.6 blanket
360mm	1.93	1.23	1.39	1.49
450mm	1.93	1.3	1.51	1.64
600mm	1.93	1.38	1.65	1.83
Solid 1a, 2a & 3a	1.5	1.5	1.5	1.5
All non-solid; 1b, 2b & 3b solid	1.3	1.3	1.3	1.3

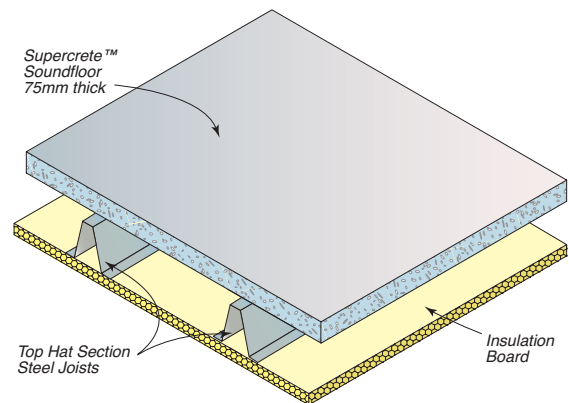
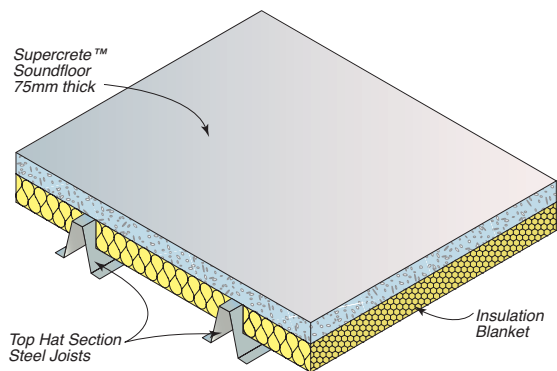
1. For open/exposed sub-floors. Add the RValues for ground under a suspended floor (see separate sheet) to the above figures
2. Add floor covering RValues to the above figures

## Construction R Values for Supercrete™ 75mm Soundfloor with 100 x 0.75thk Top Hat Steel Joists



1. For open/exposed sub-floors. Add the RValues for ground under a suspended floor (see separate sheet) to the above figures
2. Add floor covering RValues to the above figures
3. Line R 1.5 is NZBC minimum required for Solid Construction (excluding solid timber) for Zones 1a, 2a & 3a
4. Line R 1.3 is NZBC minimum required for Non-solid Construction for all Zones & Zones 1b, 2b & 3b for Solid Construction (excluding solid timber)

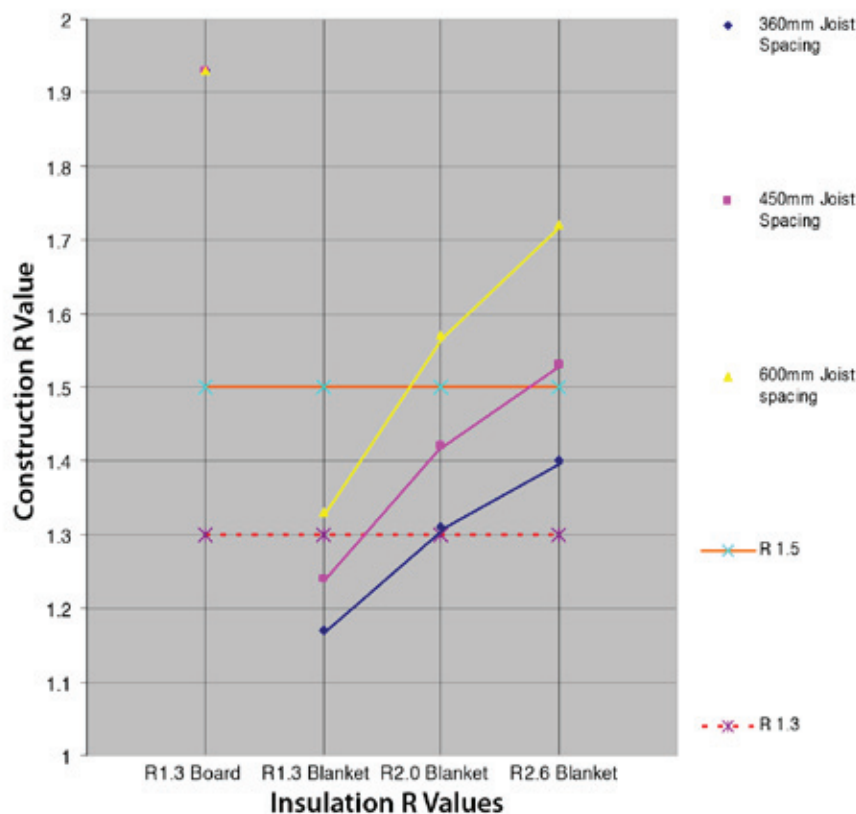
# Supercrete™ 75mm Soundfloor with 100 x 0.95BMT Tophat Joists



Joist Depth	Insulation			
	R1.3 Board	R1.3 blanket	R2.0 blanket	R2.6 blanket
60x.95 TH	1.93	1.17	1.31	1.4
100x.75TH	1.93	1.24	1.42	1.53
100x.95TH	1.93	1.33	1.57	1.72
Solid 1a, 2a & 3a	1.5	1.5	1.5	1.5
All non-solid; 1b, 2b & 3b solid	1.3	1.3	1.3	1.3

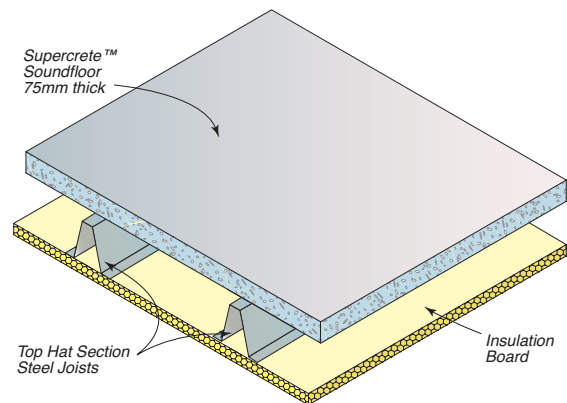
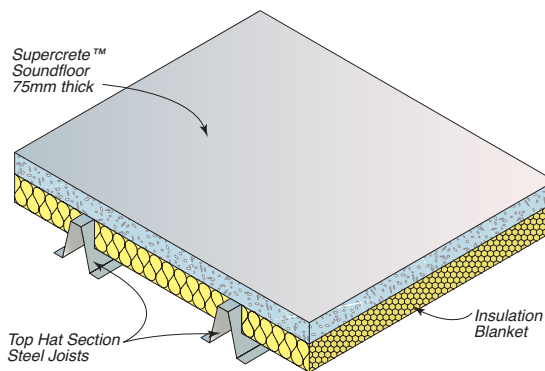
1. For open/exposed sub-floors. Add the RValues for ground under a suspended floor (see separate sheet) to the above figures
2. Add floor covering RValues to the above figures

## Construction R Values for Supercrete™ 75mm Soundfloor with 100 x 0.95thk Top Hat Steel Joists



1. For open/exposed sub-floors. Add the RValues for ground under a suspended floor (see separate sheet) to the above figures
2. Add floor covering RValues to the above figures
3. Line R 1.5 is NZBC minimum required for Solid Construction (excluding solid timber) for Zones 1a, 2a & 3a
4. Line R 1.3 is NZBC minimum required for Non-solid Construction for all Zones & Zones 1b, 2b & 3b for Solid Construction (excluding solid timber)

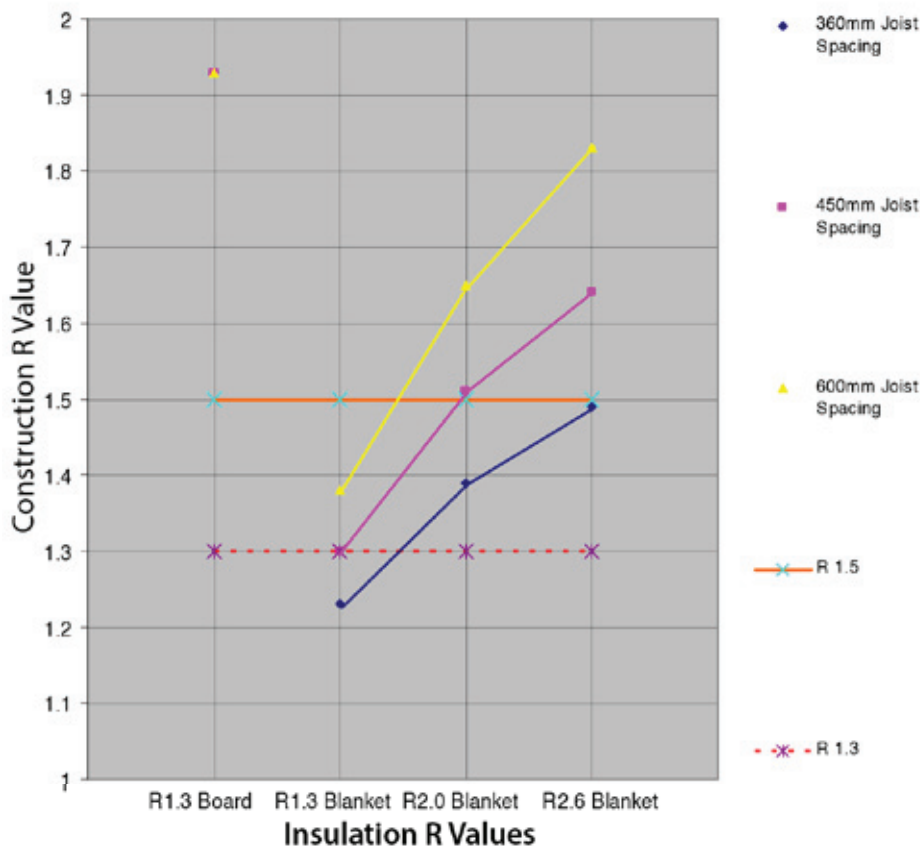
# Supercrete™ 75mm Soundfloor with 120 x 0.95BMT Tophat Joists



Joist Spacing	Insulation			
	R1.3 Board	R1.3 blanket	R2.0 blanket	R2.6 blanket
360mm	1.93	1.23	1.39	1.49
450mm	1.93	1.3	1.51	1.64
600mm	1.93	1.38	1.65	1.83
Solid 1a, 2a & 3a	1.5	1.5	1.5	1.5
All non-solid; 1b, 2b & 3b solid	1.3	1.3	1.3	1.3

1. For open/exposed sub-floors. Add the RValues for ground under a suspended floor (see separate sheet) to the above figures
2. Add floor covering RValues to the above figures

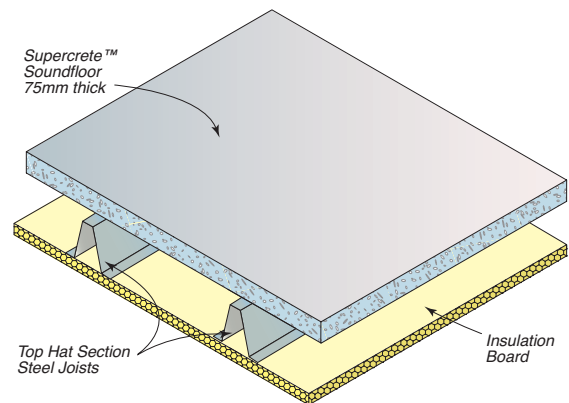
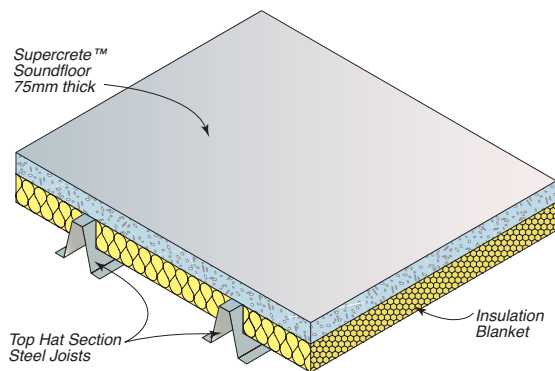
## Construction R Values for Supercrete™ 75mm Soundfloor with 120 x 0.95thk Top Hat Steel Joists



1. For open/exposed sub-floors. Add the RValues for ground under a suspended floor (see separate sheet) to the above figures
2. Add floor covering RValues to the above figures
3. Line R 1.5 is NZBC minimum required for Solid Construction (excluding solid timber) for Zones 1a, 2a & 3a
4. Line R 1.3 is NZBC minimum required for Non-solid Construction for all Zones & Zones 1b, 2b & 3b for Solid Construction (excluding solid timber)



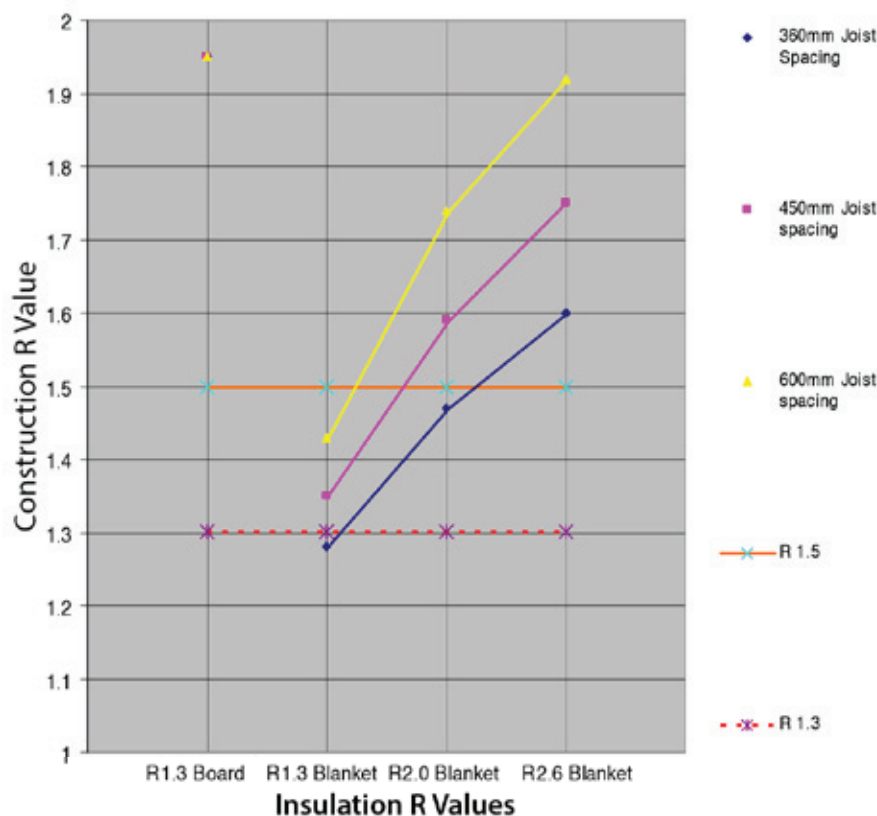
# Supercrete™ 75mm Soundfloor with 150 x 0.95BMT Tophat Joists



Joist Spacing	Insulation			
	R1.3 Board	R1.3 blanket	R2.0 blanket	R2.6 blanket
360mm	1.95	1.28	1.47	1.6
450mm	1.95	1.35	1.59	1.75
600mm	1.95	1.43	1.74	1.92
Solid 1a, 2a & 3a	1.5	1.5	1.5	1.5
All non-solid; 1b, 2b & 3b solid	1.3	1.3	1.3	1.3

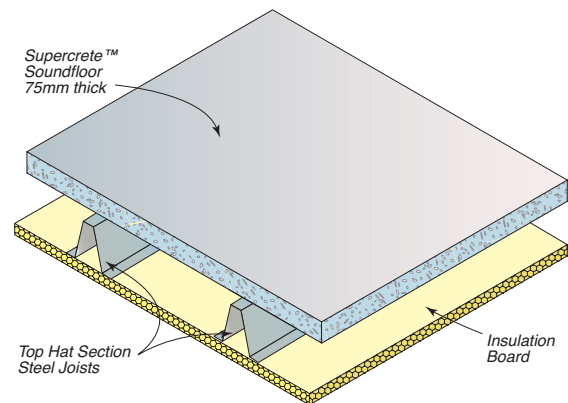
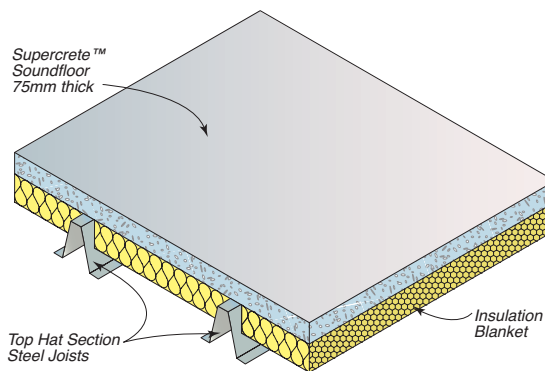
1. For open/exposed sub-floors. Add the RValues for ground under a suspended floor (see separate sheet) to the above figures
2. Add floor covering RValues to the above figures

## Construction R Values for Supercrete™ 75mm Soundfloor with 150 x 0.95thk Top Hat Steel Joists



1. For open/exposed sub-floors. Add the RValues for ground under a suspended floor (see separate sheet) to the above figures
2. Add floor covering RValues to the above figures
3. Line R 1.5 is NZBC minimum required for Solid Construction (excluding solid timber) for Zones 1a, 2a & 3a
4. Line R 1.3 is NZBC minimum required for Non-solid Construction for all Zones & Zones 1b, 2b & 3b for Solid Construction (excluding solid timber)

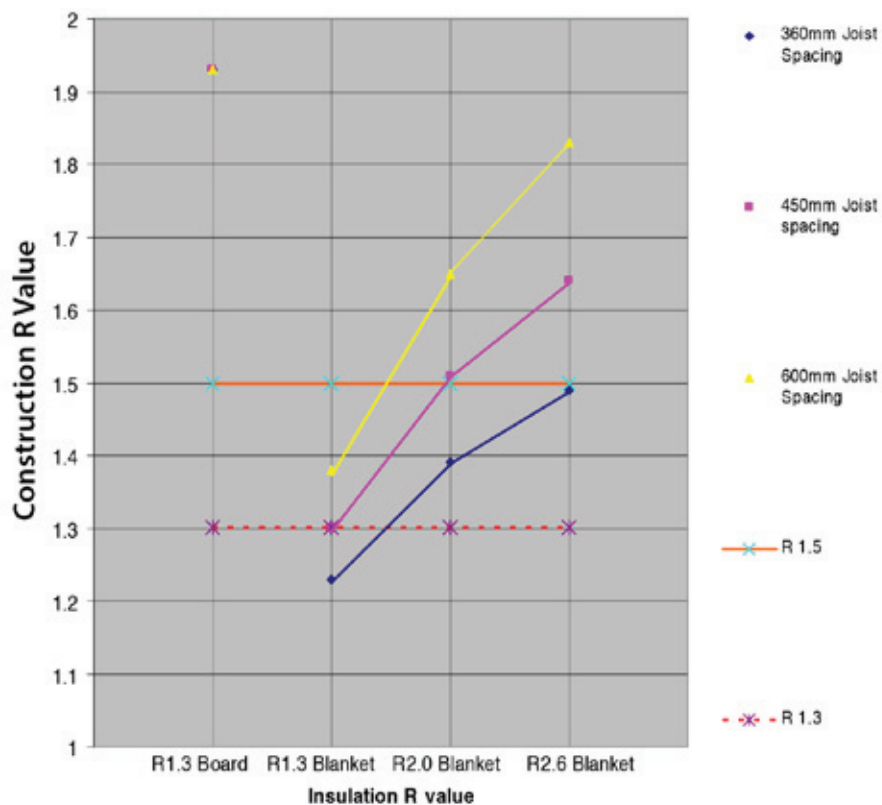
# Supercrete™ 75mm Soundfloor with 150 x 1.15BMT Tophat Joists



Joist Spacing	Insulation			
	R1.3 Board	R1.3 blanket	R2.0 blanket	R2.6 blanket
360mm	1.93	1.23	1.39	1.49
450mm	1.93	1.3	1.51	1.64
600mm	1.93	1.38	1.65	1.83
Solid 1a, 2a & 3a	1.5	1.5	1.5	1.5
All non-solid; 1b, 2b & 3b solid	1.3	1.3	1.3	1.3

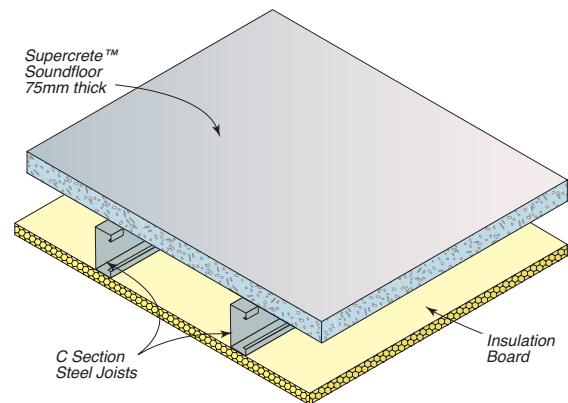
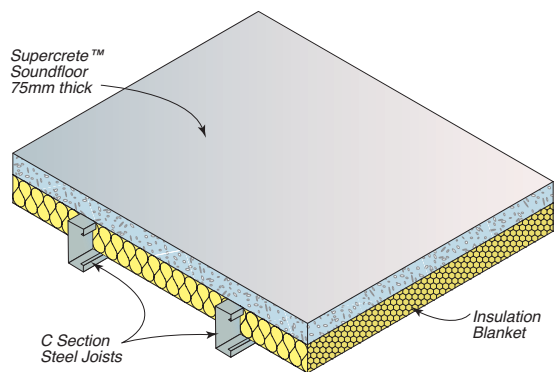
1. For open/exposed sub-floors. Add the RValues for ground under a suspended floor (see separate sheet) to the above figures
2. Add floor covering RValues to the above figures

## Construction R Values for Supercrete™ 75mm Soundfloor with 150 x 1.15thk Top Hat Steel Joists



1. For open/exposed sub-floors. Add the RValues for ground under a suspended floor (see separate sheet) to the above figures
2. Add floor covering RValues to the above figures
3. Line R 1.5 is NZBC minimum required for Solid Construction (excluding solid timber) for Zones 1a, 2a & 3a
4. Line R 1.3 is NZBC minimum required for Non-solid Construction for all Zones & Zones 1b, 2b & 3b for Solid Construction (excluding solid timber)

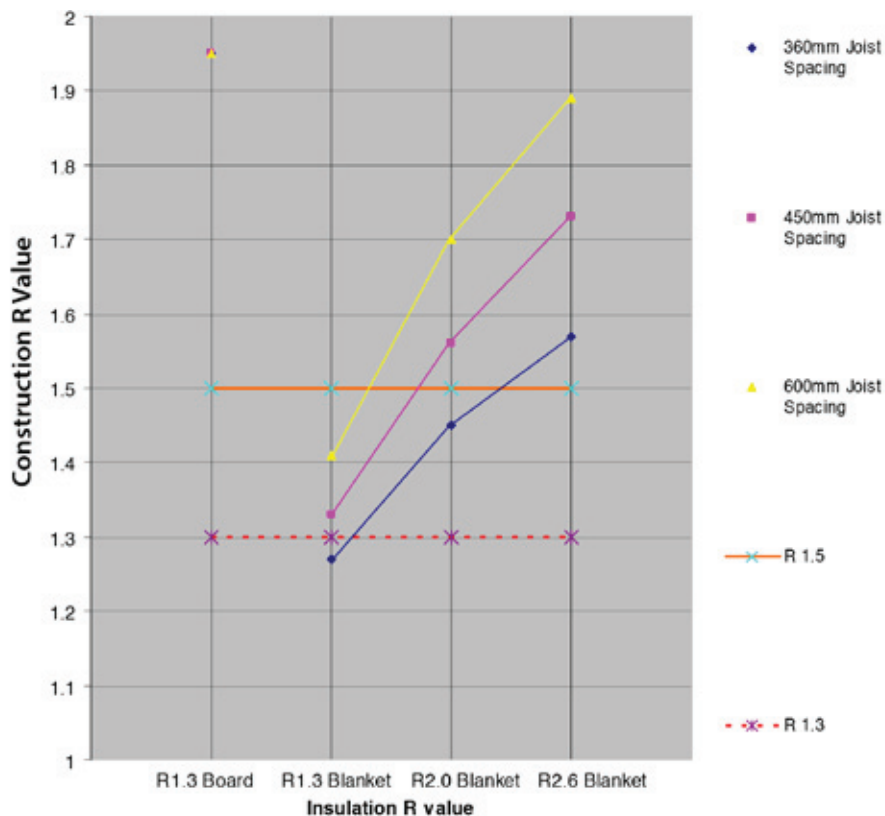
# Supercrete™ 75mm Soundfloor with 150 “C” Section Steel Joists



Joist Spacing	Insulation			
	R1.3 Board	R1.3 blanket	R2.0 blanket	R2.6 blanket
360mm	1.95	1.27	1.45	1.57
450mm	1.95	1.33	1.56	1.73
600mm	1.95	1.41	1.7	1.89
Solid 1a, 2a & 3a	1.5	1.5	1.5	1.5
All non-solid; 1b, 2b & 3b solid	1.3	1.3	1.3	1.3

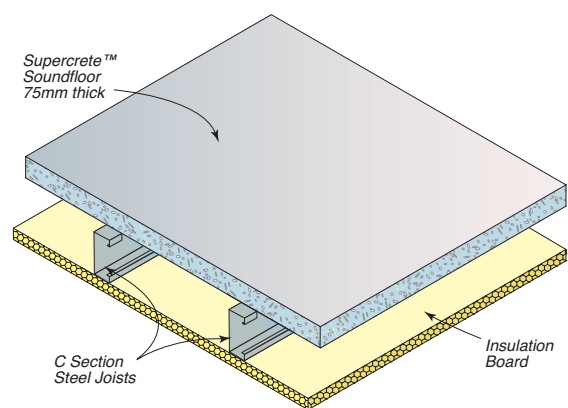
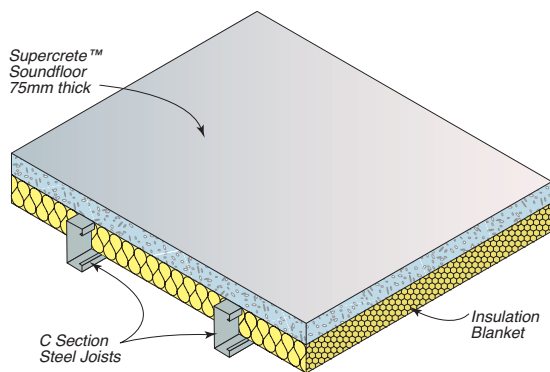
1. For open/exposed sub-floors. Add the RValues for ground under a suspended floor (see separate sheet) to the above figures
2. Add floor covering RValues to the above figures

## Construction R Values for Supercrete™ 75mm Soundfloor with 150 “C” Section Steel Joists



1. For open/exposed sub-floors. Add the RValues for ground under a suspended floor (see separate sheet) to the above figures
2. Add floor covering RValues to the above figures
3. Line R 1.5 is NZBC minimum required for Solid Construction (excluding solid timber) for Zones 1a, 2a & 3a
4. Line R 1.3 is NZBC minimum required for Non-solid Construction for all Zones & Zones 1b, 2b & 3b for Solid Construction (excluding solid timber)

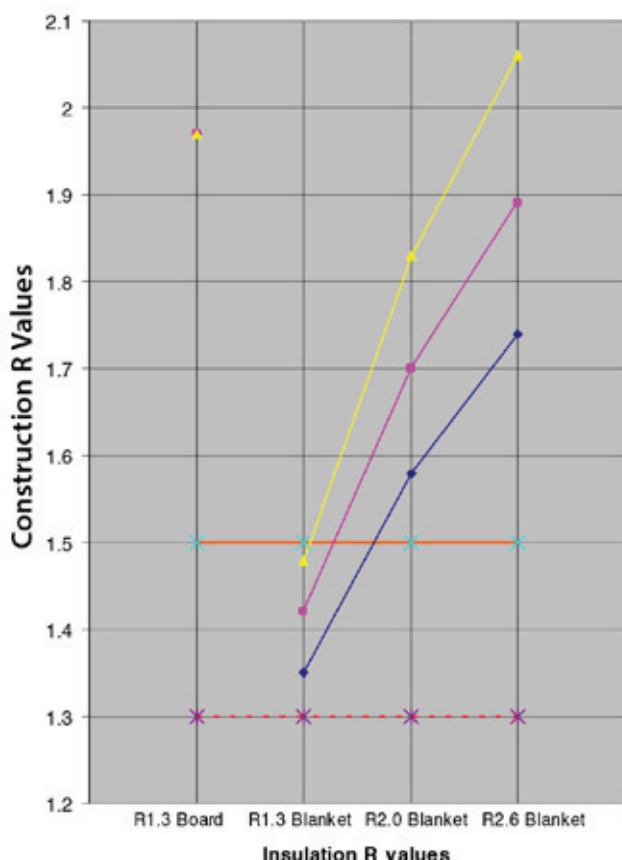
# Supercrete™ 75mm Soundfloor with 200 “C” Section Steel Joists



Joist Spacing	Insulation			
	R1.3 Board	R1.3 blanket	R2.0 blanket	R2.6 blanket
360mm	1.97	1.35	1.58	1.74
450mm	1.97	1.42	1.7	1.89
600mm	1.97	1.48	1.83	2.06
Solid 1a, 2a & 3a	1.5	1.5	1.5	1.5
All non-solid; 1b, 2b & 3b solid	1.3	1.3	1.3	1.3

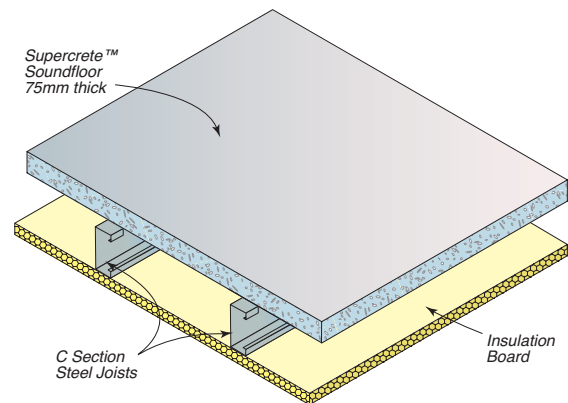
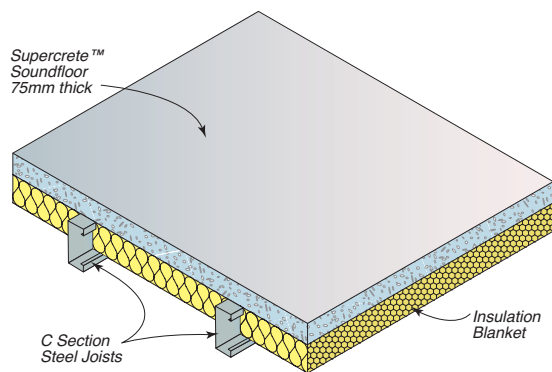
1. For open/exposed sub-floors. Add the RValues for ground under a suspended floor (see separate sheet) to the above figures
2. Add floor covering RValues to the above figures

## Construction R Values for Supercrete™ 75mm Soundfloor with 200 “C” Section Steel Joists



1. For open/exposed sub-floors. Add the RValues for ground under a suspended floor (see separate sheet) to the above figures
2. Add floor covering RValues to the above figures
3. Line R 1.5 is NZBC minimum required for Solid Construction (excluding solid timber) for Zones 1a, 2a & 3a
4. Line R 1.3 is NZBC minimum required for Non-solid Construction for all Zones & Zones 1b, 2b & 3b for Solid Construction (excluding solid timber)

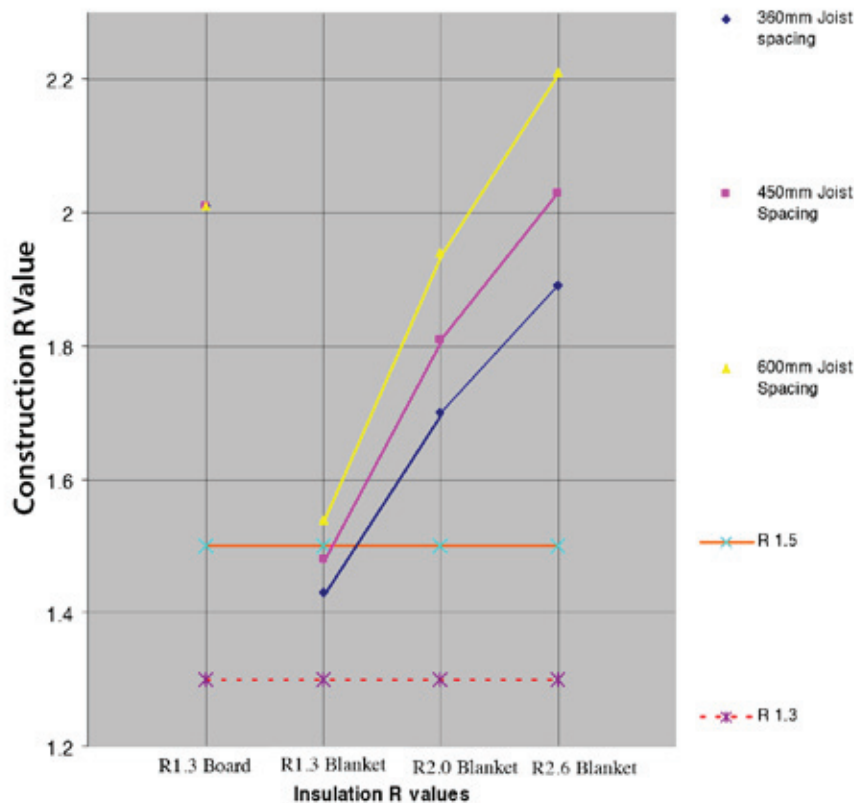
# Supercrete™ 75mm Soundfloor with 250 “C” Section Steel Joists



Joist Spacing	Insulation			
	R1.3 Board	R1.3 blanket	R2.0 blanket	R2.6 blanket
60x.95 TH	2.01	1.43	1.7	1.89
100x.75TH	2.01	1.48	1.81	2.03
100x.95TH	2.01	1.54	1.94	2.21
Solid 1a, 2a & 3a	1.5	1.5	1.5	1.5
All non-solid; 1b, 2b & 3b solid	1.3	1.3	1.3	1.3

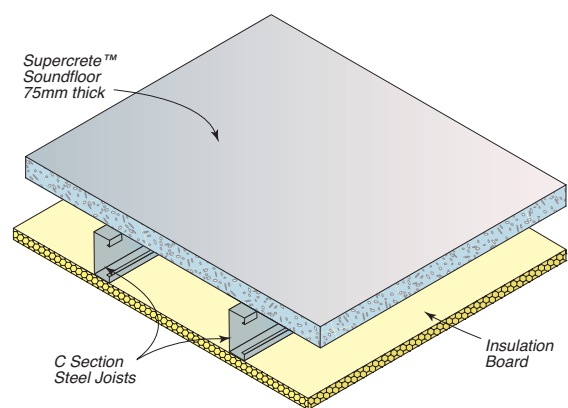
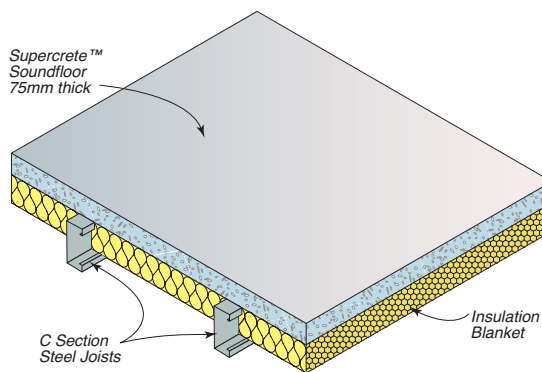
1. For open/exposed sub-floors. Add the RValues for ground under a suspended floor (see separate sheet) to the above figures
2. Add floor covering RValues to the above figures

## Construction R Values for Supercrete™ 75mm Soundfloor with 250 “C” Section Steel Joists



1. For open/exposed sub-floors. Add the RValues for ground under a suspended floor (see separate sheet) to the above figures
2. Add floor covering RValues to the above figures
3. Line R 1.5 is NZBC minimum required for Solid Construction (excluding solid timber) for Zones 1a, 2a & 3a
4. Line R 1.3 is NZBC minimum required for Non-solid Construction for all Zones & Zones 1b, 2b & 3b for Solid Construction (excluding solid timber)

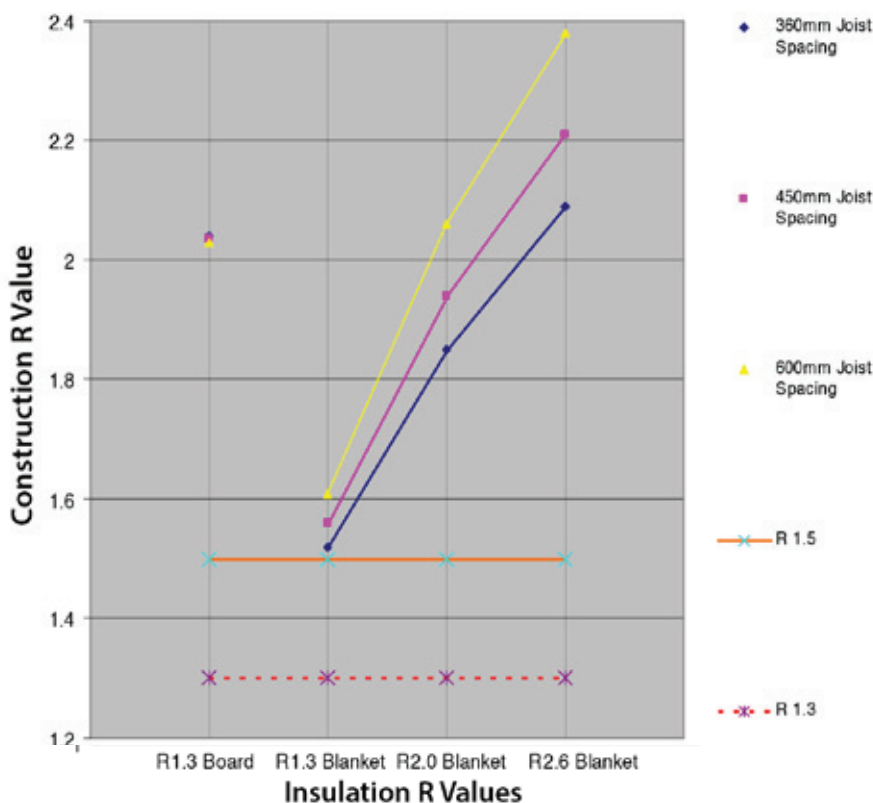
# Supercrete™ 75mm Soundfloor with 300 “C” Section Steel Joists



Joist Spacing	Insulation			
	R1.3 Board	R1.3 blanket	R2.0 blanket	R2.6 blanket
360mm	2.04	1.52	1.85	2.09
450mm	2.035	1.56	1.94	2.21
600mm	2.03	1.61	2.06	2.38
Solid 1a, 2a & 3a	1.5	1.5	1.5	1.5
All non-solid; 1b, 2b & 3b solid	1.3	1.3	1.3	1.3

1. For open/exposed sub-floors. Add the RValues for ground under a suspended floor (see separate sheet) to the above figures
2. Add floor covering RValues to the above figures

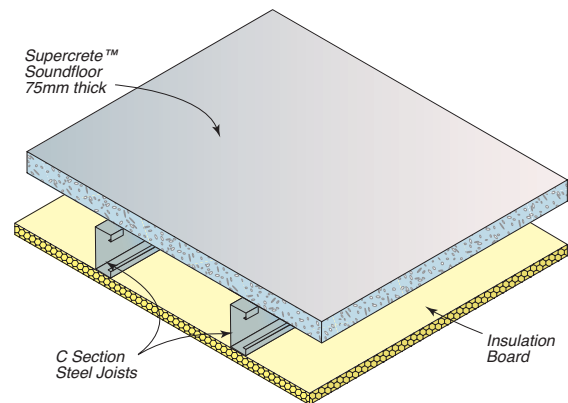
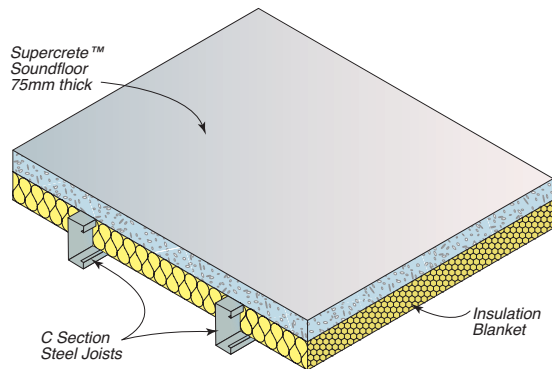
## Construction R Values for Supercrete™ 75mm Soundfloor with 300 “C” Section Steel Joists



1. For open/exposed sub-floors. Add the RValues for ground under a suspended floor (see separate sheet) to the above figures
2. Add floor covering RValues to the above figures
3. Line R 1.5 is NZBC minimum required for Solid Construction (excluding solid timber) for Zones 1a, 2a & 3a
4. Line R 1.3 is NZBC minimum required for Non-solid Construction for all Zones & Zones 1b, 2b & 3b for Solid Construction (excluding solid timber)



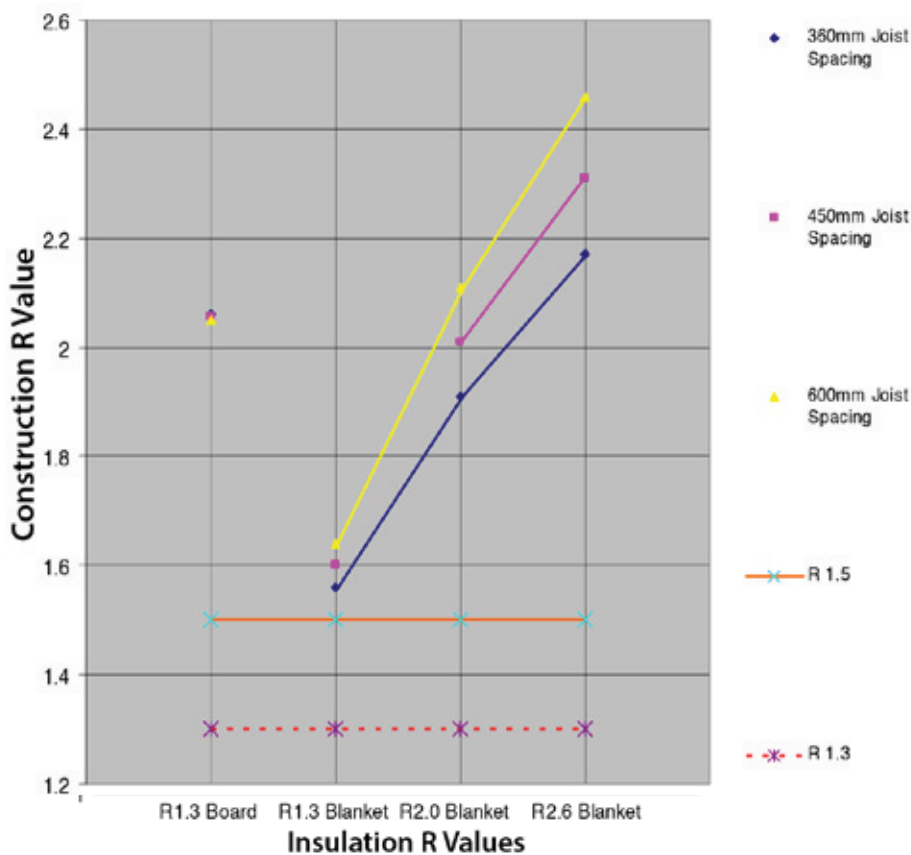
# Supercrete™ 75mm Soundfloor with 350 “C” Section Steel Joists



Joist Spacing	Insulation			
	R1.3 Board	R1.3 blanket	R2.0 blanket	R2.6 blanket
360mm	2.06	1.56	1.91	2.17
450mm	2.055	1.6	2.01	2.31
600mm	2.05	1.64	2.11	2.46
Solid 1a, 2a & 3a	1.5	1.5	1.5	1.5
All non-solid; 1b, 2b & 3b solid	1.3	1.3	1.3	1.3

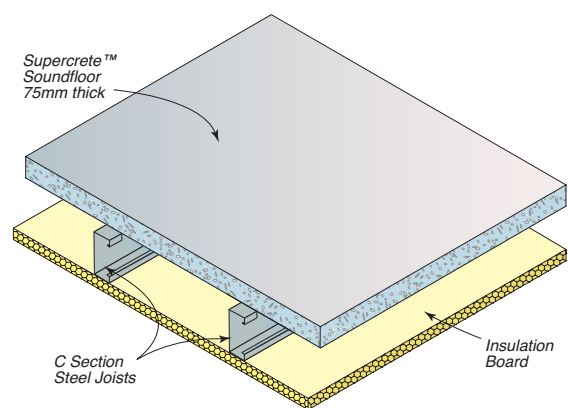
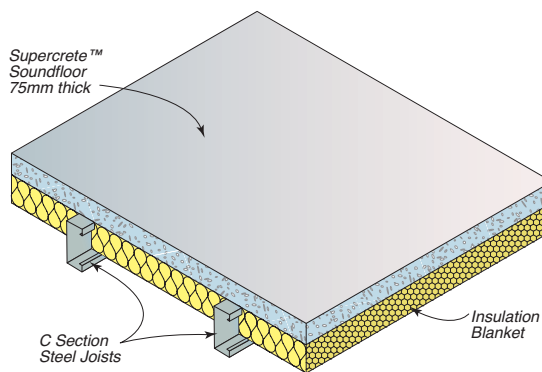
1. For open/exposed sub-floors. Add the RValues for ground under a suspended floor (see separate sheet) to the above figures
2. Add floor covering RValues to the above figures

## Construction R Values for Supercrete™ 75mm Soundfloor with 350 “C” Section Steel Joists



1. For open/exposed sub-floors. Add the RValues for ground under a suspended floor (see separate sheet) to the above figures
2. Add floor covering RValues to the above figures
3. Line R 1.5 is NZBC minimum required for Solid Construction (excluding solid timber) for Zones 1a, 2a & 3a
4. Line R 1.3 is NZBC minimum required for Non-solid Construction for all Zones & Zones 1b, 2b & 3b for Solid Construction (excluding solid timber)

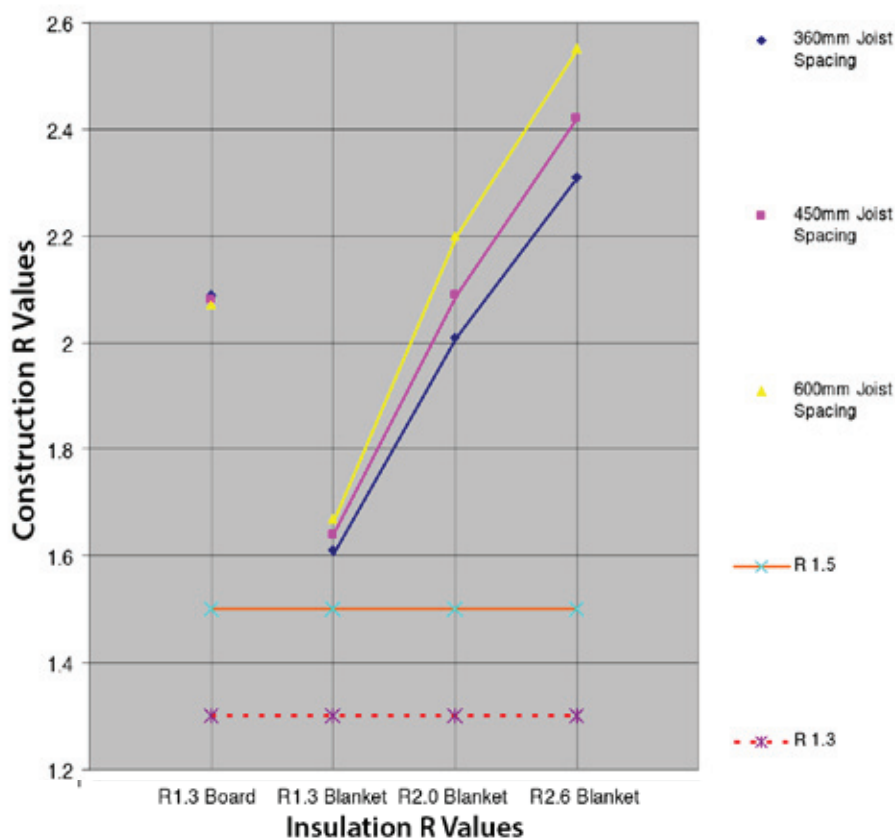
# Supercrete™ 75mm Soundfloor with 400 “C” Section Steel Joists



Joist Spacing	Insulation			
	R1.3 Board	R1.3 blanket	R2.0 blanket	R2.6 blanket
360mm	2.09	1.61	2.01	2.31
450mm	2.08	1.64	2.09	2.42
600mm	2.07	1.67	2.2	2.55
Solid 1a, 2a & 3a	1.5	1.5	1.5	1.5
All non-solid; 1b, 2b & 3b solid	1.3	1.3	1.3	1.3

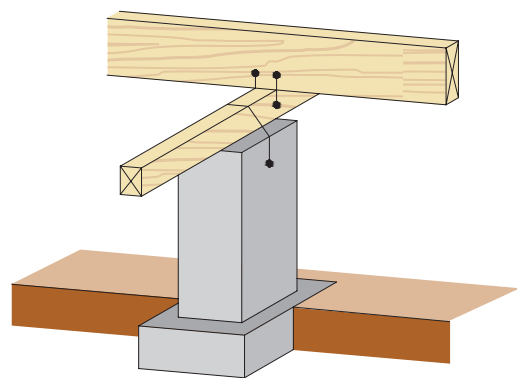
1. For open/exposed sub-floors. Add the RValues for ground under a suspended floor (see separate sheet) to the above figures
2. Add floor covering RValues to the above figures

## Construction R Values for Supercrete™ 75mm Soundfloor with 400 “C” Section Steel Joists



1. For open/exposed sub-floors. Add the RValues for ground under a suspended floor (see separate sheet) to the above figures
2. Add floor covering RValues to the above figures
3. Line R 1.5 is NZBC minimum required for Solid Construction (excluding solid timber) for Zones 1a, 2a & 3a
4. Line R 1.3 is NZBC minimum required for Non-solid Construction for all Zones & Zones 1b, 2b & 3b for Solid Construction (excluding solid timber)

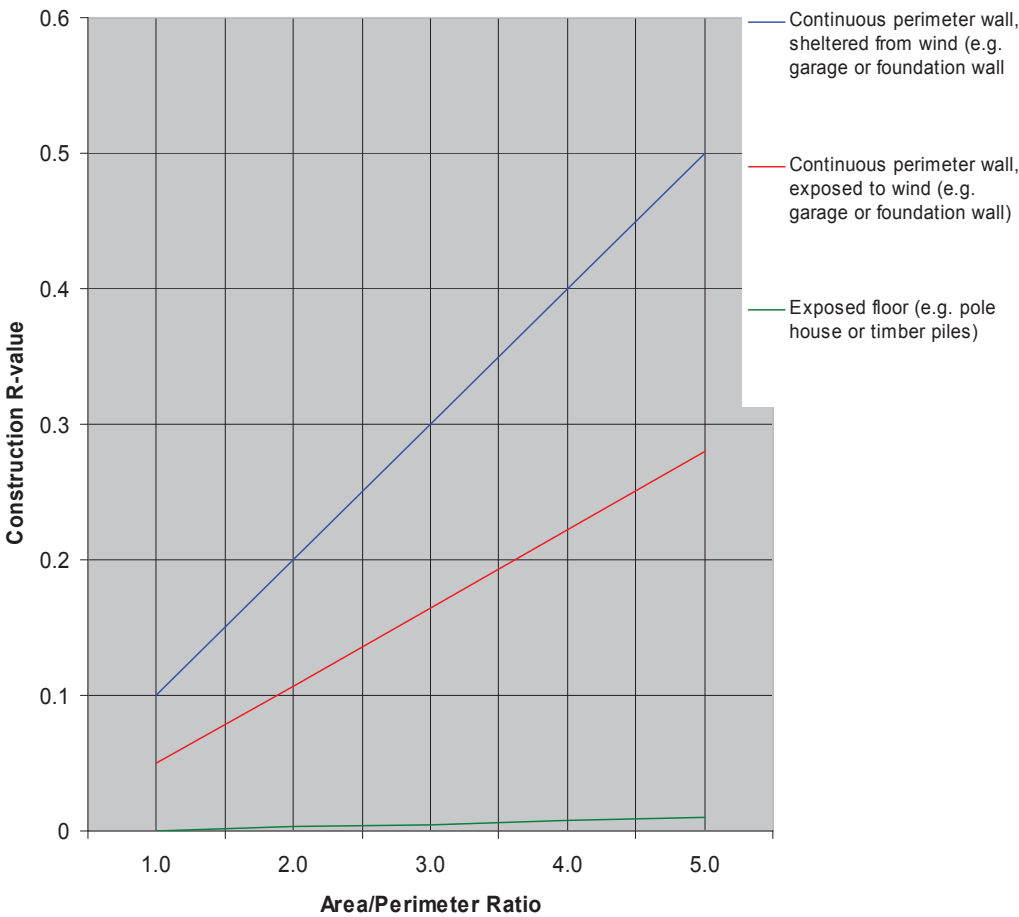
# Construction R-V alues Beneath Suspended Floor



	Area/Perimeter Ratio				
	1.0	2.0	3.0	4.0	5.0
Continuous perimeter wall, sheltered from wind (e.g. garage or foundation wall)	0.1	0.2	0.3	0.4	0.5
Continuous perimeter wall, exposed to wind (e.g. garage or foundation wall)	0.05	0.11	0.17	0.22	0.28
Exposed floor (e.g. pole house or timber piles)	0	0	0	0.01	0.01

Add the R Value for the ground under a suspended floor to the R Value for the suspended floor system

Construction R Values for Ground under Suspended Floor



## Technical Support

Superbuild International Ltd and its network of Distributors offers technical assistance across New Zealand. Visit [www.superbuild.co.nz](http://www.superbuild.co.nz) for your local Distributor who will offer free estimating services; technical support to project architects, engineers, builders and owners.

## Health & Safety

Information on any known health risks of our products and how to handle them safely is shown on their package and/or the documentation accompanying them.

Additional information is listed in the Material Safety Data sheet. To obtain a copy, telephone 0800 GO 4 SUPER or visit [www.superbuild.co.nz](http://www.superbuild.co.nz)

## Guarantee

Supercrete™ Autoclaved Aerated Concrete products and Supercoat™ Coating System products are guaranteed to be free of defect in material and manufacture.

Installation workmanship and coating application work is guaranteed by the personnel who perform this work.

Substitution of this claddings' listed components is not permissible and if alternative brands, materials or elements are used, this will void all guarantees.

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