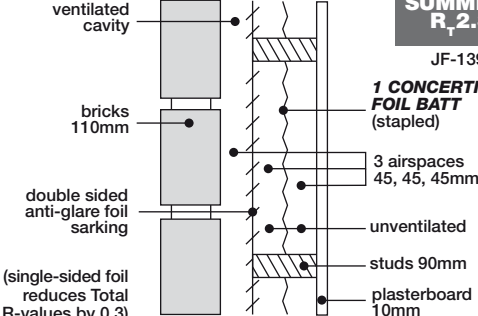
	<b>REFLECTIVITY</b> Aluminium Foil 97% (0.97) Anti-Glare Foil 80% (0.80)	<ul style="list-style-type: none"> <li>The Total R-value (R<sub>T</sub>) calculations are in accordance with AS/NZS 4859.1:2002/Amdt1:2006, and are based on a temperature difference between indoor and outdoor air temperatures of 6°C for winter and 12°C for summer.</li> <li>The contribution of <b>CONCERTINA FOIL BATTS</b> to Total R-value depends on installation and environmental conditions.</li> <li>The R-value will be reduced in the event of the accumulation of dust on upward facing surfaces and in those cavities that are ventilated.</li> <li>Anti-glare RFL foil sarking is based on double-sided (D/S) foil laminate in continuous roll form, anti-glare ink applied (eg. Bradford 733).</li> </ul>
	<b>EMITTANCE</b> Aluminium Foil 3% (0.03) Anti-Glare Foil 20% (0.20)	

### WALLS




### BRICK VENEER (BV1)

**WINTER R<sub>T</sub> 2.6**  
**SUMMER R<sub>T</sub> 2.3**  
JF-139.21

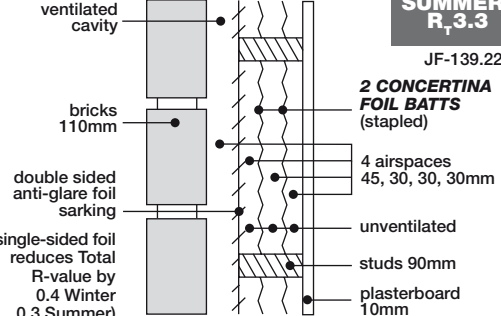


1 **CONCERTINA FOIL BATT** (stapled)

(single-sided foil reduces Total R-values by 0.3)

### BRICK VENEER (BV2)

**WINTER R<sub>T</sub> 3.8**  
**SUMMER R<sub>T</sub> 3.3**  
JF-139.22



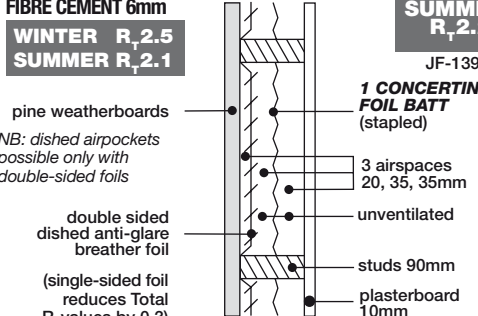
2 **CONCERTINA FOIL BATTS** (stapled)

(single-sided foil reduces Total R-value by 0.4 Winter 0.3 Summer)

### WEATHERBOARD (WB1)

**WINTER R<sub>T</sub> 2.6**  
**SUMMER R<sub>T</sub> 2.2**  
JF-139.23

**FIBRE CEMENT 6mm**  
**WINTER R<sub>T</sub> 2.5**  
**SUMMER R<sub>T</sub> 2.1**



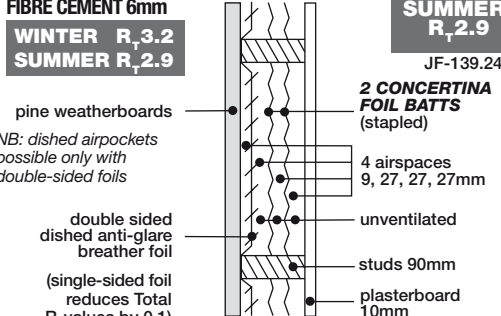
1 **CONCERTINA FOIL BATT** (stapled)

(single-sided foil reduces Total R-values by 0.3)

### WEATHERBOARD (WB2)

**WINTER R<sub>T</sub> 3.3**  
**SUMMER R<sub>T</sub> 2.9**  
JF-139.24


**FIBRE CEMENT 6mm**  
**WINTER R<sub>T</sub> 3.2**  
**SUMMER R<sub>T</sub> 2.9**



2 **CONCERTINA FOIL BATTS** (stapled)

(single-sided foil reduces Total R-values by 0.1)

### TIMBER FLOORS

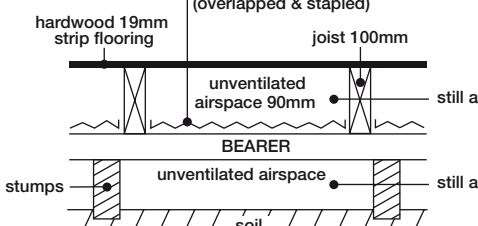


### GROUND FLOOR ENCLOSED BUILDING PERIMETER (TF1)

**WINTER R<sub>T</sub> 3.0**  
**SUMMER R<sub>T</sub> 1.5**  
JF-139.011

(BV walls/clad walls with close weave shade cloth behind base boards)

Perforated **CONCERTINA FOIL BATT** for floors (overlapped & stapled)

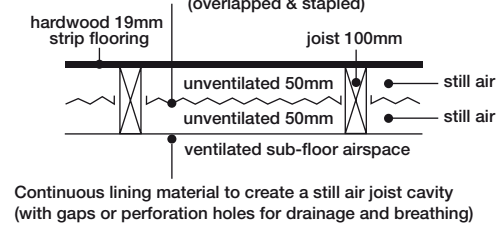


hardwood 19mm strip flooring, joist 100mm, unventilated airspace 90mm, BEARER, stumps, unventilated airspace, soil

### SUSPENDED FLOOR OPEN BUILDING PERIMETER + CLOSED JOIST CAVITIES (TF2)

**WINTER R<sub>T</sub> 2.8**  
**SUMMER R<sub>T</sub> 1.2**  
JF-139.012

Perforated **CONCERTINA FOIL BATT** for floors (overlapped & stapled)



hardwood 19mm strip flooring, joist 100mm, unventilated 50mm, ventilated sub-floor airspace

Continuous lining material to create a still air joist cavity (with gaps or perforation holes for drainage and breathing)  
Example: standard RFL roll foil - foil side down

### ROOF - CEILINGS



**CONCERTINA FOIL BATTS**

- laid on bulk insulation - not stapled
- triangular foil airspaces formed

### METAL ROOF - PITCHED

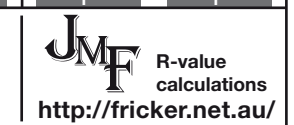
<b>(MR1)</b> <b>WINTER R<sub>T</sub> 4.4</b> <b>SUMMER R<sub>T</sub> 4.9</b> JF-139.15 FOIL SARKING D/S anti-glare under 40mm battens unventilated R2.5 bulk insulation R3.5 bulk WINTER R <sub>T</sub> 5.4 SUMMER R <sub>T</sub> 5.9 R4.0 bulk WINTER R <sub>T</sub> 6.0 SUMMER R <sub>T</sub> 6.3	<b>(MR2)</b> <b>WINTER R<sub>T</sub> 3.9</b> <b>SUMMER R<sub>T</sub> 4.3</b> JF-139.151 NO FOIL SARKING unventilated R2.5 bulk insulation R3.5 bulk WINTER R <sub>T</sub> 5.0 SUMMER R <sub>T</sub> 5.2 R4.0 bulk WINTER R <sub>T</sub> 5.5 SUMMER R <sub>T</sub> 5.7
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### TILE ROOF

<b>(TR1)</b> <b>WINTER R<sub>T</sub> 4.3</b> <b>SUMMER R<sub>T</sub> 4.7</b> JF-139.16 FOIL SARKING D/S anti-glare under 40mm battens unventilated R2.5 bulk insulation R3.5 bulk WINTER R <sub>T</sub> 5.3 SUMMER R <sub>T</sub> 5.6 R4.0 bulk WINTER R <sub>T</sub> 5.8 SUMMER R <sub>T</sub> 6.1	<b>(TR2)</b> <b>WINTER R<sub>T</sub> 3.6</b> <b>SUMMER R<sub>T</sub> 4.3</b> JF-139.161 NO FOIL SARKING ventilated R2.5 bulk insulation R3.5 bulk WINTER R <sub>T</sub> 4.7 SUMMER R <sub>T</sub> 5.3 R4.0 bulk WINTER R <sub>T</sub> 5.2 SUMMER R <sub>T</sub> 5.7
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Wren Industries products are marked with the Benchmark Product Certification Mark. This indicates that the conformity of our product is based upon technical documentation and an annual review of our manufacturing and quality control process to ensure we consistently produce products in compliance with AS/NZS 4859.1:2002/Amdt 1:2006. Client I.D. 2832  
The Product Certification Mark program is accredited by the Joint Accreditation System of Australia and New Zealand (JAS-ANZ).



# CONCERTINA *FOIL BATT*<sup>™</sup>

## INSTALLATION INSTRUCTIONS – CEILING ROOFS

AUGUST 2009

www.concertinafoilbatts.com  
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### **FOIL BATT Laid ON TOP OF BULK INSULATION: BATT OR LOOSE-FILL**

(*FOIL BATT* primary function: to reduce downward radiant heat flow)

This combination insulation is typically for dual cold and hot Winter and Summer climates. Further information:

<http://www.concertinafoilbatts.com/foilfacts.htm>

#### 1. Select appropriate *FOIL BATT* pack size to suit ceiling joist / truss centres

- 450 centres - one 1350 x 600 
- 600 centres - two 1350 x 425 
- 900 centres - two 1350 x 600 

#### 2. Expand *FOIL BATT* sheets and lay on top of bulk insulation

(batt or loose-fill) – stapling is not advisable and allows future removal of *FOIL BATT*s for any reason. Joists will mostly remain visible for roof access. Maintain upright equal triangular profile for maximum thermal performance, ie concertinas are not shallow and not compressed. Thermally effective upward and downward foil airspaces are formed, which is not the case with conventional roll foil laid flat making contact on bulk insulation.

#### 3. Overlapping and coverage of *FOIL BATT*s

End to end overlaps – allow minimum 50mm.

- 450 centres – one *FOIL BATT* makes perfect fit
- 600 & 900 centres – two *FOIL BATT*s are laid together with one excess concertina available for side by side overlapping, which is not essential but will create a complete and interlocking grid pattern of *FOIL BATT*s which may be useful in highly ventilated roof spaces. For summer radiant heat flow down, *FOIL BATT*s do not have to make tight fitting air-seals because there is no “convective heat” gain downwards (see BCA notes).

#### 4. Cut or tear *FOIL BATT*s to fit around vertical roofing members joining the ceiling. NB: 100% coverage is not essential against radiation heat flow down.

### **ATTIC ROOMS, CATHEDRAL & FLAT ROOFS**

#### **FOIL BATTs STAPLED BETWEEN RAFTERS**

(*FOIL BATT* primary function: to reduce downward radiant heat flow)

In confined cavities one or two layers of *FOIL BATT*s can be stapled taut between rafters, with effective 50-100mm spacing airgaps. If summer radiant heat flow down is the dominant concern, then bulk insulations should not be used because radiation will rapidly penetrate the resistance capabilities of the fibres (ie which are tested at max. 33degC)

### **FOIL BATTs STAPLED ON TOP OF JOISTS & TRUSS BOTTOM CORDS**

\* Not applicable for steel framing

(*FOIL BATT* primary function: to reduce downward radiant heat flow)

This example is typically suited for dominant hot climates.

BCA Vol 2 Housing - Climate Zones 1 & 2 (below 300m)

- direction of heat flow DOWN.

#### 1. Select appropriate *FOIL BATT* pack size to suit ceiling joist and truss centres (see 3).

#### 2. Expand individual *FOIL BATT* sheets and staple to tops of joists, pulled tight and taut with minimal concertina profile, creating a uniformly deep foil airspace within the 90mm joist / truss, which produces the maximum Summer R-value heat flow downwards.

#### 3. Overlapping and coverage of *FOIL BATT*s

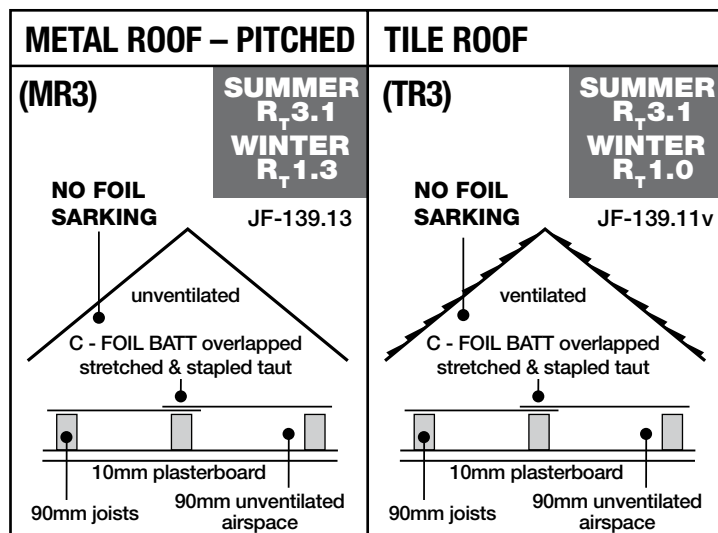
End to end overlaps – allow minimum 50mm.

- 450 centres - 1350 x 450 size stapled parallel with joists, with overlap flaps pressed down flush
- 600 centres - 1350 x 600 (as above)

For summer radiant heat flow down, *FOIL BATT*s do not have to make tight fitting air seals because there is no “convective heat” flow downwards (see BCA notes).

#### 4. Cut or tear *FOIL BATT*s to fit around vertical roofing members joining the ceiling.

*Special Note: FOIL BATTs are double-sided segmented foil sheets and easy to work with. Conventional roll foil laid and stapled over joists is more difficult to handle in restricted roof spaces, in particular truss roofs. Ductwork also reduces access.*



**TOTAL R-VALUES conforming to ASNZS 4859.1**  
(refer Design Drawings -1)

[www.concertinafoilbatts.com/thermal.htm](http://www.concertinafoilbatts.com/thermal.htm)



full Foil Batt expanded



protects cooling ductwork

#### **Building Code of Australia (BCA) NOTES**

*FOIL BATT*s are segmented foil insulations and not classified as roll-form ‘sarking-type’ membranes (refer *Definitions* BCA Vol 2 - Part 1.1 & Vol 1 - Part A1.1).

Roll membrane reflective insulation:

Option to overlap foil is permitted - minimum 50mm.

BCA Vol 2 - 3.12.1.1(b) & Vol 1 - J1.2(b).

Adopt same requirements for *CONCERTINA FOIL BATT*s.

[BCA Climate Zones](#)

[www.abcb.gov.au](http://www.abcb.gov.au) (search “Climate Maps”)

### WALLS

#### 1. Measure.

Place compressed FOIL BATT between top (or bottom) plate and nogging and mark length.

#### 2. Cut.

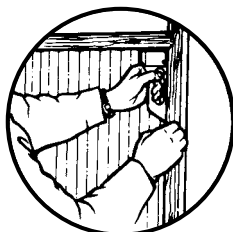
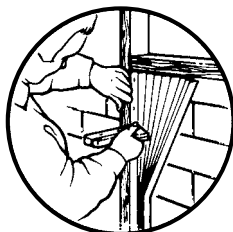
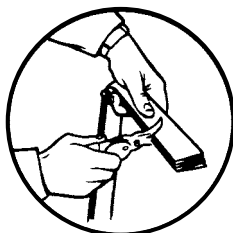
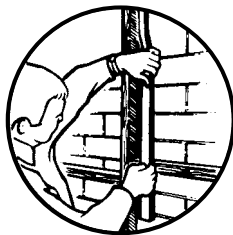
FOIL BATT should be cut square and make a close fit with contact to top timber, so as to prevent rotational air movement between cavities. Tight fit at bottom not necessary. One batt should fit each cavity. Any overlaps should be sealed by stapling or taping.

#### 3. Fix.

The FOIL BATT is fitted so that there is an approx. 45mm closed air gap between the FOIL BATT and plasterboard, and an additional 45mm insulating air gap between the FOIL BATT and the normal foil wrap. Minimum airspace width 20mm (NB: no foil airspace with fibre batts.)

(a) Staple one flange of the FOIL BATT to a stud side with approximately 5-6 staples.

(b) Expand FOIL BATT and staple free edge to opposite stud, creating a shallow concertina profile - with narrow stud centres, gather up excess folds. For sloping top plates and uneven noggins, first staple FOIL BATT to the longest stud, then expand and staple to other stud. Crush and staple excess batt to the underside of the top timber. Trim away excess foil.



FOIL BATTS in walls are not a sarking-type product, i.e. should not be exposed to the weather - wind or rain. External wall cladding is normally in place first, and batts are fitted after all electrical and plumbing work is completed (i.e. just before plastering).

FOIL BATTS are simply placed in front or behind plumbing, whichever side is clearest for stapling, and cut to fit over taps or pipes where necessary.

### SAFETY INFORMATION

- FOIL BATTS are non-hazardous / non-toxic
- No personal protective equipment required unless installing over irritant fibrous insulations.
- UV protective sunglasses and sunscreen should be used when installing in direct sunlight (eg new floor construction with no roof in place).

#### Electrical Conformance

AS/NZS3000:2007 - clause 4.5.2.2

Minimum downlight clearances for bulk insulations: incandescent 50mm, halogen 200mm, transformers 50mm. Apply same for FOIL BATTS. Avoid contact between all foil insulations and un-insulated electrical cables and fittings.

AS/NZS3008.1.1:1998 - clause 3.4.3

'Reflective foil laminates are not considered to be bulk thermal insulation' - and have free circulation of air and do not contribute to heat build-up in electrical cabling.

### FLOORS

#### PERFORATED CONCERTINA FOIL BATTS

1. **Staple FOIL BATTS** 90mm down on sides of floor joists (approx. 6 staples) with a maximum airspace depth of 100mm to achieve the maximum R-value for winter. FOIL BATTS are expanded creating a shallow concertina profile and held taut with staple in flange corners, to minimise sagging. With narrow joist centres gather up excess folds. For 200mm "I" beams, FOIL BATTS are stapled at 100mm depth. FOIL BATTS are self supporting.

2. **Overlap adjoining FOIL BATTS** by a minimum 50mm. No cutting is needed. Sealed overlaps are not necessary as heat flow is downward radiation in winter, ie. there is no convective winter heat loss from floors (refer 7 still air).

3. **FOIL BATTS to be installed as flooring is laid** and not be exposed to wind or rain. Open joist ends should be covered if necessary for protection from wind and rain during construction, eg dampcourse type material. Install FOIL BATTS preferably after electrical, plumbing and ductwork are completed.

4. **Upward FOIL BATT surface** is clean, bright and free of all sawdust and debris to obtain best thermal performance, i.e. level the tops of joists first before fitting FOIL BATTS, then fit the flooring.

5. **Drainage.** FOIL BATTS perforations are specifically designed for platform sheet flooring, where roof is not on. Holes are in concertina valleys to allow quick draining of any rain penetrating the floor during construction, as well as any moisture formed by possible condensation (low risk generally).

6. **Timbers can breathe** because of FOIL BATTS deep airspaces and unsealed overlaps. Be aware that alternative insulations will require substantial perforations for drainage and breathing.

7. **Still air.** The stated Total R-values are dependent on the creation of still air and zero air velocity beneath timber floors for both the airspace above and below FOIL BATTS.

Enclosed building perimeters achieve this still air with:

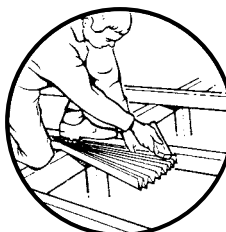
- Brick veneer or cavity brick construction - automatically creates still air. Ventilator plates are too small to permit high air speed entry and exit.
- Weatherboard or fibro-cement cladding - minimise gaps between base boards and fix black close-weave shade cloth behind boards as a wind break. No air speed.

Open building perimeters (eg pole frame houses) require a perforated floor joist underlining to create still air and ensure breathing and drainage (eg building paper/foil). With 100mm joists, create two 50mm FOIL BATT airspaces which are surrounded by still air.

8. **Existing Floors.** Perforated or non-perforated FOIL BATTS can be used. If there is a risk of condensation, then ensure that perforation holes are closest to the ground by reversing the folds of the stapling flanges.

9. **Coverage.** In winter under floor insulation does not require a 100% complete coverage, eg FOIL BATTS do not need to make a tight or close fit around ductwork.

#### STAPLING



#### INSTALLED

