



Appendix B

Fabric and airtightness

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Original source documents follow. Page references are positions in this combined PDF.

Certificate of Air Permeability Test

Acoustic South East



ATTMA
The Air Tightness Testing & Measurement Association

UCRN: 11912962

Test Undertaken By Josh Robinson of Acoustic South East

Registered Company Details

Acoustic South East
Address: 8 Highdown House
Shoreham Airport
Shoreham-by-Sea
BN43 5PB
Telephone: 01273 455074
Email: air@aasussex.co.uk

Registered Tester Details

Technician: Josh Robinson
Registration No: 16326
Qualification: 1 2 3 PH EA
✓

For clarification on technician qualifications please visit:
<https://www.bcta.group/attma/members/>

Building Details

Building identifier: Plot 1
Site address: Malthouse Lane, Hurstpierpoint, West Sussex, BN6 9JX
Type: Dwelling **Description:** House - Semi Detached
Construction: Timber Frame **Warm roof:** No
Size: Footprint (m²) 40.7 Envelope (m²) 213 Volume (m³) 200.7 Storey 2
Ventilation: System 4 - Continuous Mechanical Extraction with Heat Recovery
Primary heating: ASHP **Air conditioning:** None
Mastic sealing: Internal Walls Only (inc. sanitary ware)

Test Details

Test Date: 07/09/2026

Report reference: J4270
Retest: No **Build progress:** Completed
Data acquisition: **Test type:** Whole Building - Depressurised
Temporary sealing: Tester placed temporary sealing on 8 MVHR vents.

Deviations from Test Standard

Deviations:

Notifications:

Test Results

Target:	<= 3.00	m ³ .h ⁻¹ .m ⁻² @50Pa	Air Permeability:
Air Flow Coefficient (C_{env}):	47.782	m ³ .h ⁻¹ .Pa ⁿ	2.97 m ³ .h ⁻¹ .m ⁻² @50Pa
Air Leakage at 50Pa (Q50)	631.574	m ³ .h ⁻¹	
Air Flow Exponent (n):	0.66		
Coefficient of Determination (r²):	0.9980		

This is to certify that the above name building has been tested by a registered provider in accordance with CIBSE TM23, subject to the above statements regarding temporary sealing and deviations from these test standards.

This certificate is a short form report. If a full compliant report is required please contact the company that issued the certificate.

Pass



ES5R-T6PM-7U8X



ATTMA is part of the Building Compliance Testers Association (BCTA).
The BCTA is a trade association for companies that conduct on-site testing and operate within controlled, audited schemes.

Certificate of Air Permeability Test

Acoustic South East



ATTMA
The Air Tightness Testing & Measurement Association

UCRN: 11912961

Test Undertaken By Josh Robinson of Acoustic South East

Registered Company Details

Acoustic South East
Address: 8 Highdown House
Shoreham Airport
Shoreham-by-Sea
BN43 5PB
Telephone: 01273 455074
Email: air@aasussex.co.uk

Registered Tester Details

Technician: Josh Robinson
Registration No: 16326
Qualification: 1 2 3 PH EA
✓

For clarification on technician qualifications please visit:
<https://www.bcta.group/attma/members/>

Building Details

Building identifier: Plot 2
Site address: Malthouse Lane, Hurstpierpoint, West Sussex, BN6 9JX
Type: Dwelling **Description:** House - Semi Detached
Construction: Timber Frame **Warm roof:** No
Size: Footprint (m²) 40.7 Envelope (m²) 213 Volume (m³) 200.7 Storey 2
Ventilation: System 4 - Continuous Mechanical Extraction with Heat Recovery
Primary heating: ASHP **Air conditioning:** None
Mastic sealing: Internal Walls Only (inc. sanitary ware).

Test Details

Test Date: 07/09/2026

Report reference: J4270
Retest: No **Build progress:** Completed
Data acquisition: **Test type:** Whole Building - Depressurised
Temporary sealing: Tester placed temporary sealing on 8 MVHR vents.

Deviations from Test Standard

Deviations:

Notifications:

Test Results

Target:	<= 3.00	m ³ .h ⁻¹ .m ⁻² @50Pa	Air Permeability:
Air Flow Coefficient (C_{env}):	41.665	m ³ .h ⁻¹ .Pa ⁿ	2.72 m ³ .h ⁻¹ .m ⁻² @50Pa
Air Leakage at 50Pa (Q50)	578.845	m ³ .h ⁻¹	
Air Flow Exponent (n):	0.67		
Coefficient of Determination (r²):	0.9980		

This is to certify that the above name building has been tested by a registered provider in accordance with CIBSE TM23, subject to the above statements regarding temporary sealing and deviations from these test standards.

This certificate is a short form report. If a full compliant report is required please contact the company that issued the certificate.

Pass



82PX-M338-3822



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Certificate of Air Permeability Test

Acoustic South East



ATTMA
The Air Tightness Testing & Measurement Association

UCRN: 11907987

Test Undertaken By Josh Robinson of Acoustic South East

Registered Company Details

Acoustic South East
Address: 8 Highdown House
Shoreham Airport
Shoreham-by-Sea
BN43 5PB
Telephone: 01273 455074
Email: air@aasussex.co.uk

Registered Tester Details

Technician: Josh Robinson
Registration No: 16326
Qualification: 1 2 3 PH EA
✓
For clarification on technician qualifications please visit:
<https://www.bcta.group/attma/members/>

Building Details

Building identifier: Plot 3
Site address: Malthouse Lane, Hurstpierpoint, West Sussex, BN6 9JX
Type: Dwelling **Description:** House - Semi Detached
Construction: Timber Frame **Warm roof:** No
Size: **Footprint (m²)** 51.1 **Envelope (m²)** 245.1 **Volume (m³)** 248 **Storey** 2
Ventilation: System 4 - Continuous Mechanical Extraction with Heat Recovery
Primary heating: ASHP **Air conditioning:** None
Mastic sealing: Internal Walls Only (inc. sanitary ware).

Test Details

Test Date: 26/08/2026

Report reference: J4270
Retest: No **Build progress:** Completed
Data acquisition: **Test type:** Whole Building - Depressurised
Temporary sealing: Tester placed temporary sealing on 9 MVHR vents.

Deviations from Test Standard

Deviations:

Notifications:

Test Results

Target:	<= 3.00	m³.h⁻¹.m⁻²@50Pa	Air Permeability:
Air Flow Coefficient (C_{env}):	47.564	m³.h⁻¹.Paⁿ	2.23 m ³ .h ⁻¹ .m ⁻² @50Pa
Air Leakage at 50Pa (Q50)	546.523	m³.h⁻¹	
Air Flow Exponent (n):	0.63		
Coefficient of Determination (r²):	0.9930		

This is to certify that the above name building has been tested by a registered provider in accordance with CIBSE TM23, subject to the above statements regarding temporary sealing and deviations from these test standards.

This certificate is a short form report. If a full compliant report is required please contact the company that issued the certificate.

Pass



D8GB-7V29-JD9T



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Certificate of Air Permeability Test

Acoustic South East



ATTMA
The Air Tightness Testing & Measurement Association

UCRN: 11912963

Test Undertaken By Josh Robinson of Acoustic South East

Registered Company Details

Acoustic South East

Address: 8 Highdown House
Shoreham Airport
Shoreham-by-Sea
BN43 5PB

Telephone: 01273 455074

Email: air@aasussex.co.uk

Registered Tester Details

Technician: Josh Robinson

Registration No: 16326

Qualification: 1 2 3 PH EA
✓

For clarification on technician qualifications please visit:

<https://www.bcta.group/attma/members/>

Building Details

Building identifier: Plot 4

Site address: Malthouse Lane, Hurstpierpoint, West Sussex, BN6 9JX

Type: Dwelling

Description: House - Semi Detached

Construction: Timber Frame

Warm roof: No

Size: Footprint (m²) 51.1

Envelope (m²) 245.1

Volume (m³) 248

Storey 2

Ventilation: System 4 - Continuous Mechanical Extraction with Heat Recovery

Primary heating: ASHP

Air conditioning: None

Mastic sealing: Internal Walls Only (inc. sanitary ware).

Test Details

Test Date: 07/09/2026

Report reference: J4270

Retest: Yes

Build progress:

Data acquisition:

Test type:

Depressurised

Temporary sealing: Tester placed temporary sealing on 9 MVHR vents.

Deviations from Test Standard

Deviations:

Notifications:

Test Results

Target:	<= 3.00	m ³ .h ⁻¹ .m ⁻² @50Pa	Air Permeability:
Air Flow Coefficient (C _{env}):	42.254	m ³ .h ⁻¹ .Pa ⁿ	2.69 m ³ .h ⁻¹ .m ⁻² @50Pa
Air Leakage at 50Pa (Q50)	658.775	m ³ .h ⁻¹	
Air Flow Exponent (n):	0.70		
Coefficient of Determination (r ²):	0.9980		

This is to certify that the above name building has been tested by a registered provider in accordance with CIBSE TM23, subject to the above statements regarding temporary sealing and deviations from these test standards.

This certificate is a short form report. If a full compliant report is required please contact the company that issued the certificate.

Pass



E6P2-BQ34-6WDM



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The BCTA is a trade association for companies that conduct on-site testing and operate within controlled, audited schemes.



**B R I T I S H
WOODWORKING
F E D E R A T I O N**

U-value Calculation Certificate

This is to certify that

TA WINDOWS

of

**Unit 4, Newstead Industrial Estate, Crowcroft Road, Trentham,
STOKE-ON-TRENT, Staffordshire, ST4 8HX**

has achieved a thermal transmittance U-value of:

1.3 W/m²K

for: **BR 443 Model Flush Casement Softwood Window**

In accordance with calculations carried out on the BBA software tool, in compliance with BS EN ISO 10077-1:2006 using the following criteria:

Timber density:	510 kg/m ³
Frame thickness, d ₁ :	95 mm
Casement thickness, d ₂ :	64 mm
Thermal transmittance of glazing:	1.2 W/m ² K
Double glazing cavity size:	16 mm
Gas filling:	Argon
Low Emissivity coat:	0.05 x 1
Type & linear thermal transmittance of spacer:	Warm edge 0.031 W/mK

Certificate Number: **BBA-BWF-061478-4**

Notified Body Name and Number: **N/A**

Date of issue: **January 2014**

The window dimensions are based on the test specimen size in accordance with BS EN 14351-1:2006+A1:2010 Table E.1. This U-value is not suitable to be used in window energy ratings calculations or U-value simulations according to BS EN ISO 10077-2. This certificate remains the property of BWF and shall be returned upon request.

The Building Centre, 26 Store Street, London WC1E 7BT
Tel: 0844 209 2610 • Fax 0844 209 2611
e-mail: bwf@bwf.org.uk • web: www.bwf.org.uk



**B R I T I S H
WOODWORKING
F E D E R A T I O N**

U-value Calculation Certificate

This is to certify that

TA WINDOWS LTD

of

**Gordon Banks Drive, Trentham,
STOKE-ON-TRENT, Staffordshire, ST4 4TW**

has achieved a thermal transmittance U-value of:

1.4 W/m²K

for: Type 6 - Fully Glazed Softwood French Doorset Pattern 10

In accordance with calculations carried out on the BBA Software Tool, in compliance with BS EN ISO 10077-1:2006 using the following criteria:

Timber density:	510 kg/m ³
Frame thickness, d ₁ :	95 mm
Door leaf thickness, d ₂ :	63 mm
Composite panel nominal thickness:	N/A mm
Frame material:	Softwood
Thermal conductivity value:	0.13 W/mK
Insulation details:	N/A, N/A mm thickness, N/A W/mK
Thermal transmittance of glazing:	1.2 W/m ² K
Cavity size:	16 mm
Gas filling:	Argon
Low Emissivity coat:	0.05 x 1
Type and linear thermal transmittance of spacer:	Warm edge 0.031 W/mK

Certificate Number: **061478-5**

Notified Body Name and Number: **British Board of Agrément NB 0836**

Date of issue: **May 2017**

The doorset dimensions are based on the test specimen size in accordance with BS EN 14351-1:2006+A1:2010 Table E.2. This U-value is not suitable to be used in energy ratings calculations or U-value simulations according to BS EN ISO 10077-2. This certificate remains the property of BWF and shall be returned upon request.

The Building Centre, 26 Store Street, London WC1E 7BT
Tel: 0844 209 2610 • Fax 0844 209 2611
e-mail: bwf@bwf.org.uk • web: www.bwf.org.uk



JUNCTION SCHEDULE

28-09-2026

SCHEDULE

17 JUNCTIONS

719 Ruckford / Malthouse Cottages — As-built thermal bridging schedule — P01

SAP / HEM INPUTS

Junction	Description	Ψ for SAP W/(m·K)	SAP default (Table K1)	Against the default	f Rsi (Rsi 0.25)
E2	Ruckford / Malthouse Cottages Lintel — insulated, no base plate (window head)	0.093	1.00	91% below	0.768 ✓
E5	Ruckford / Malthouse Cottages Ground floor (suspended beam & block)	0.030	0.32	91% below	0.907 ✓
E5s	Ruckford / Malthouse Cottages Ground floor (solid ground-bearing slab)	0.058	0.32	82% below	0.908 ✓
E6	Ruckford / Malthouse Cottages Intermediate floor (within dwelling)	0.018	0.14	87% below	0.930 ✓
E10	Ruckford / Malthouse Cottages Eaves (insulation at ceiling level)	0.043	0.12	65% below	0.908 ✓
E12	Ruckford / Malthouse Cottages Gable (insulation at ceiling level)	0.039	0.25	84% below	0.907 ✓
E16	Ruckford / Malthouse Cottages Corner (normal)	0.112	0.18	38% below	0.905 ✓
E16	Ruckford / Malthouse Cottages Corner (normal)	0.117	0.18	35% below	0.904 ✓
E17	Ruckford / Malthouse Cottages Corner (inverted)	-0.042	0.00	below	0.905 ✓
E17	Ruckford / Malthouse Cottages Corner (inverted)	-0.040	0.00	below	0.904 ✓
E18	Ruckford / Malthouse Cottages Party wall / external wall Party wall: whole junction 0.104, half to each dwelling	0.052 ½	0.24	78% below	0.935 ✓
E18	Ruckford / Malthouse Cottages Party wall / external wall Party wall: whole junction 0.108, half to each dwelling	0.054 ½	0.24	78% below	0.934 ✓
P1	Ruckford / Malthouse Cottages Party wall — ground floor Party wall: whole junction 0.202, half to each dwelling	0.101 ½	0.32	68% below	0.897 ✓
P1	Ruckford / Malthouse Cottages Party wall — ground floor Party wall: whole junction 0.104, half to each dwelling	0.052 ½	0.32	84% below	0.922 ✓
P4	Ruckford / Malthouse Cottages Party wall — roof (insulation at ceiling) Party wall: whole junction 0.072, half to each dwelling	0.036 ½	0.48	92% below	0.890 ✓

Junction	Description	Ψ for SAP W/(m·K)	SAP default (Table K1)	Against the default	f Rsi (Rsi 0.25)
E4 AD412 W3 WINDOW JAMB 70mm PIR CLOSER + 30mm INSULAT ED REVEAL LINING Uw 1.30 ASSUM ED CONT INUITY fRsi PASS	Ruckford / Malthouse Cottages	-0.065	—	—	0.757 ✓
E3 AD412 W4 WINDOW SILL AS-BUILT WALL 50mm PIR CON TINUOUS UNDER CILL Uw 1.30 AS SUMED C ONTINUI TY fRsi PASS	Ruckford / Malthouse Cottages	-0.059	—	—	0.760 ✓

Enter the “ Ψ for SAP” figure for each junction; heat loss $\Psi L = \Psi \times$ junction length (m), in W/K. Junctions are listed in SAP Table K1 order, and one page for each follows in the same order.

Ψ by 2D finite-difference numerical modelling to BS EN ISO 10211:2017, surface resistances per BS EN ISO 6946, flanking elements on SAP internal dimensions for the standard junctions (BR 497). f Rsi is solved with Rsi = 0.25 m²K/W on internal surfaces (0.13 on glazing) per BR 497 / BS EN ISO 13788; 0.75 is the usual minimum for dwellings.

½ — party-wall junction: the Ψ is calculated for the whole junction and divided equally between the two dwellings (BR 497); the per-dwelling half is the figure each SAP takes.

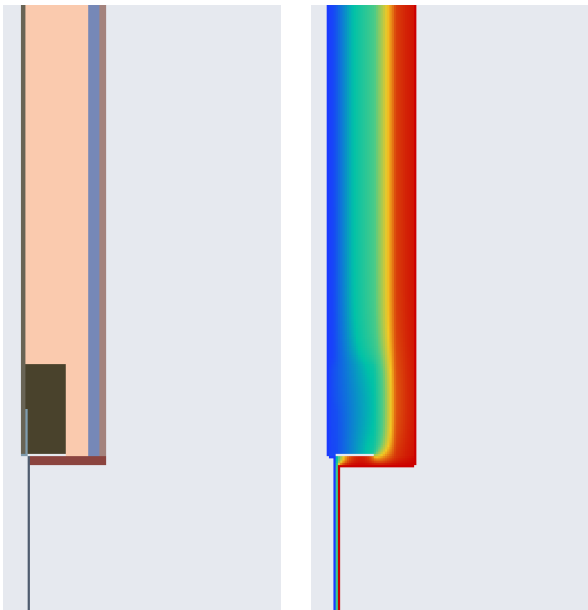
This schedule summarises. The full calculation for any junction — construction build-ups with every λ , the flanking working and quality checks — is its individual Ψ Monkey report.

E2 — Ruckford / Malthouse Cottages

Lintel — insulated, no base plate (window head) · flanking $\Sigma(U\cdot I)$ entered by hand

SAP / HEM input: enter 0.093 W/(m·K) for junction E2.

SAP Table K1 default 1.00 · notional (Table R2) 0.05 W/(m·K). This detail is 91% below the default: every 10 m of junction removes 9.07 W/K compared with the default.



Material layout Temperature field

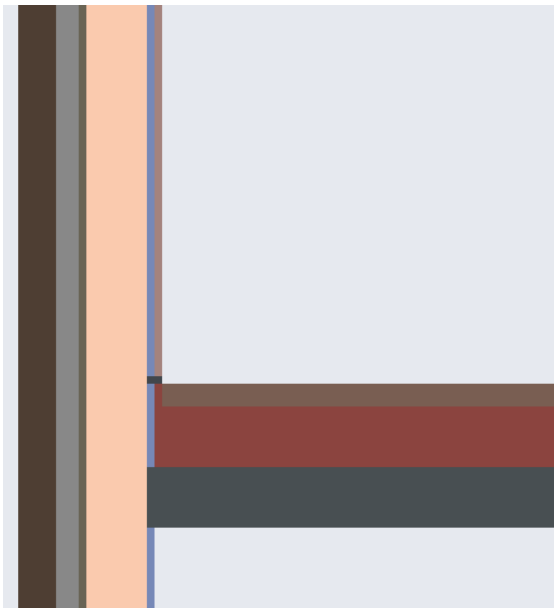
Result	Value
Ψ for SAP	0.093 W/(m·K)
L ₂ D (thermal coupling coefficient)	0.6979 W/(m·K)
Q ₂ D / Q ₁ D = ΣU·I (entered by hand)	13.958 / 12.100 W/m
f _{Rsi} (R _{si} 0.25, BR 497 / BS EN ISO 13788)	0.768 — PASS (≥ 0.75)
Minimum internal surface temperature	15.37 °C
Convergence	converged · 730 iterations · residual 9.75e-7 · heat balance 1.10e-5 %
Grid · boundary temperatures	124×270 @ 5 mm/cell · Ti 20 °C, Te 0 °C

Material	λ W/(m·K)
 Kingspan Thermawall TW55 + 15% Structural timber	0.0382
 Kingspan Thermawall TW55	0.022
 Air space + 22mm battens (service void)	0.129
 Structural timber	0.13
 Plasterboard 15mm	0.21
 OSB/3 (18mm) (9 mm drawn as 10)	0.1444
 PIR insulation (foil-faced)	0.022
 Sealed glazed unit (double)	R 0.54 m²K/W per cell
 Steel lintel profile (2mm eff.)	20

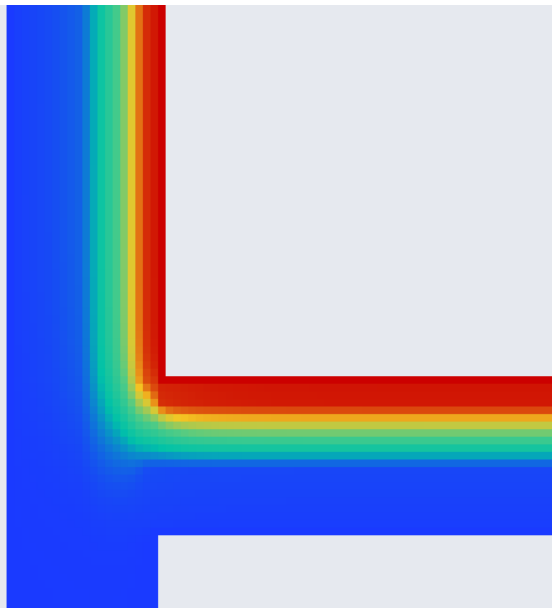
E5 — Ruckford / Malthouse Cottages

Ground floor (suspended beam & block) · flanking on SAP internal dimensions (standard junction)

SAP / HEM input: enter 0.030 W/(m·K) for junction E5.
SAP Table K1 default 0.32 · notional (Table R2) 0.16 W/(m·K). This detail is 91% below the default: every 10 m of junction removes 2.90 W/K compared with the default.



Material layout



Temperature field

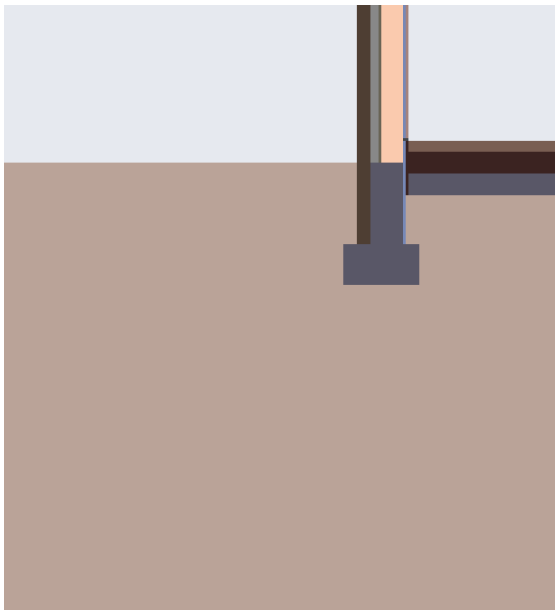
Result	Value
Ψ for SAP	0.030 W/(m·K)
L ₂ D (thermal coupling coefficient)	0.3581 W/(m·K)
Q ₂ D / Q ₁ D = ΣU·I (SAP internal dimensions)	7.161 / 6.556 W/m
f _{Rsi} (Rsi 0.25, BR 497 / BS EN ISO 13788)	0.907 — PASS (≥ 0.75)
Minimum internal surface temperature	18.13 °C
Convergence	converged · 243 iterations · residual 9.20e-7 · heat balance 1.43e-6 %
Grid · boundary temperatures	73×80 @ 20 mm/cell · Ti 20 °C, Te 0 °C

Material	λ W/(m·K)
Dense aggregate block (150 mm drawn as 160)	1.2053
PIR insulation (foil-faced) (150 mm drawn as 160)	0.0235
Facing brick	0.77
Kingspan Thermawall TW55 + 15% Structural timber (90 mm drawn as 100)	0.0424
50mm air cavity equivalent (Rc 0.18) (50 mm drawn as 60)	0.3336
Kingspan Thermawall TW55 (50 mm drawn as 60)	0.0264
Sand/cement screed (1800 kg/m³) (65 mm drawn as 60)	1.0615
OSB/3 (18mm) (9 mm drawn as 20)	0.2889
Air space + 22mm battens (service void) (25 mm drawn as 20)	0.1032
Plasterboard 15mm (15 mm drawn as 20)	0.28
Polythene DPC / DPM	0.5

E5s — Ruckford / Malthouse Cottages

Ground floor (solid ground-bearing slab) · flanking on SAP internal dimensions (standard junction)

SAP / HEM input: enter 0.058 W/(m·K) for junction E5.
SAP Table K1 default 0.32 · notional (Table R2) 0.16 W/(m·K). This detail is 82% below the default: every 10 m of junction removes 2.62 W/K compared with the default.



Material layout



Temperature field

Result	Value
Ψ for SAP	0.058 W/(m·K)
L ₂ D (thermal coupling coefficient)	0.3583 W/(m·K)
Q ₂ D / Q ₁ D = ΣU·I (SAP internal dimensions)	7.166 / 6.015 W/m
f_Rsi (Rsi 0.25, BR 497 / BS EN ISO 13788)	0.908 — PASS (≥ 0.75)
Minimum internal surface temperature	18.15 °C
Convergence	converged · 3988 iterations · residual 9.99e-7 · heat balance 4.28e-2 %
Grid · boundary temperatures	203×223 @ 20 mm/cell · Ti 20 °C, Te 0 °C

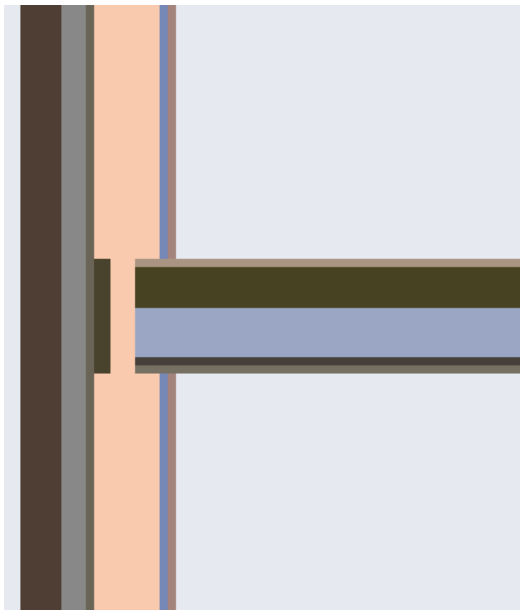
Material	λ W/(m·K)
Soil — sand / gravel (ISO 13370)	2
Dense concrete (2000 kg/m³)	1.35
Celotex GA4000 (150 mm drawn as 160)	0.0235
Facing brick	0.77
Kingspan Thermawall TW55 + 15% Structural timber (90 mm drawn as 100)	0.0424
Sand/cement screed (1800 kg/m³) (75 mm drawn as 80)	1.2267
50mm air cavity equivalent (Rc 0.18) (50 mm drawn as 60)	0.3336
Kingspan Thermawall TW55 (50 mm drawn as 60)	0.0264
Air space + 22mm battens (service void) (25 mm drawn as 20)	0.1032
OSB/3 (18mm) (9 mm drawn as 20)	0.2889
Plasterboard 15mm (15 mm drawn as 20)	0.28

Material		λ W/(m·K)
	Polythene DPC / DPM	0.5

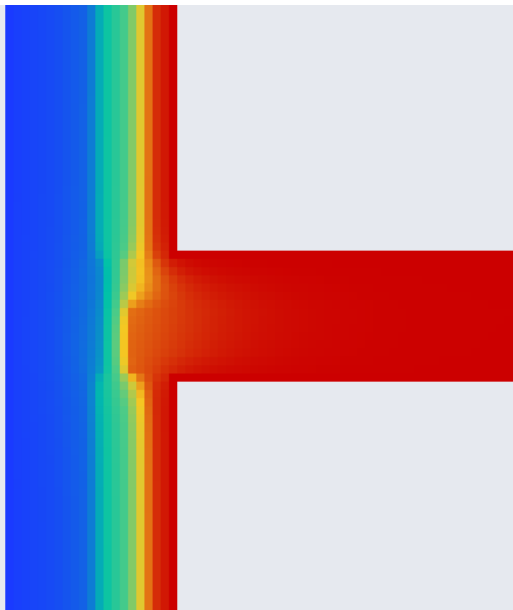
E6 — Ruckford / Malthouse Cottages

Intermediate floor (within dwelling) · flanking on SAP internal dimensions (standard junction)

SAP / HEM input: enter 0.018 W/(m·K) for junction E6.
SAP Table K1 default 0.14 · notional (Table R2) 0.00 W/(m·K). This detail is 87% below the default: every 10 m of junction removes 1.22 W/K compared with the default.



Material layout



Temperature field

Result	Value
Ψ for SAP	0.018 W/(m·K)
L ₂ D (thermal coupling coefficient)	0.2900 W/(m·K)
Q ₂ D / Q ₁ D = ΣU·I (SAP internal dimensions)	5.800 / 5.438 W/m
f_Rsi (Rsi 0.25, BR 497 / BS EN ISO 13788)	0.930 — PASS (≥ 0.75)
Minimum internal surface temperature	18.61 °C
Convergence	converged · 215 iterations · residual 9.55e-7 · heat balance 2.44e-6 %
Grid · boundary temperatures	63×74 @ 20 mm/cell · Ti 20 °C, Te 0 °C

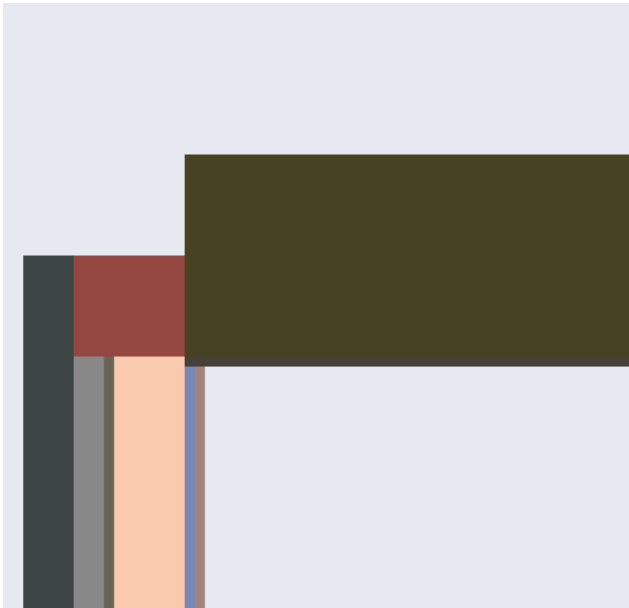
Material	λ W/(m·K)
Facing brick	0.77
Kingspan Thermawall TW55 + 15% Structural timber (90 mm drawn as 100)	0.0424
Air cavity (ISO 6946, ≥25mm) + 8% Structural timber (125 mm drawn as 120)	0.6233
Mineral wool (glass/rock) + 8% Structural timber	0.0426
50mm air cavity equivalent (Rc 0.18) (50 mm drawn as 60)	0.3336
Kingspan Thermawall TW55 (50 mm drawn as 60)	0.0264
OSB/3 (18mm) (9 mm drawn as 20)	0.2889
Air space + 22mm battens (service void) (25 mm drawn as 20)	0.1032
Plasterboard 15mm (15 mm drawn as 20)	0.28
Chipboard / P5 (22 mm drawn as 20)	0.1273
Plasterboard 12.5mm (25 mm drawn as 20)	0.168

Material		λ W/(m·K)
	Gypsum plaster (lightweight) (3 mm drawn as 20)	1.2
	+ 2 more — see the junction's own report	

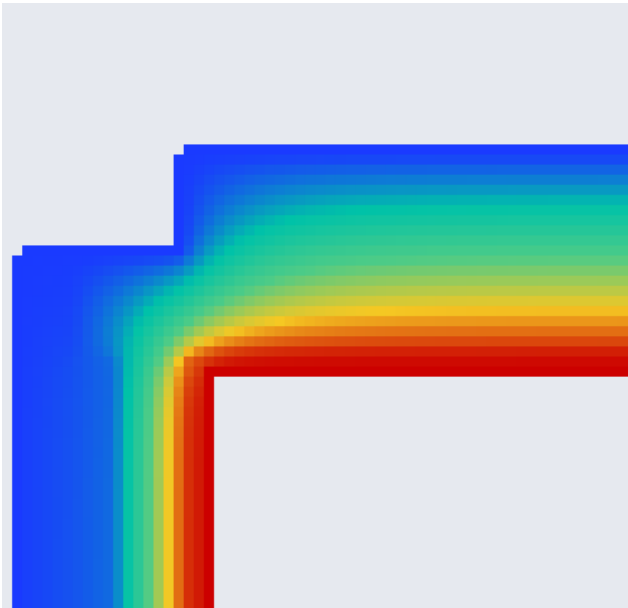
E10 — Ruckford / Malthouse Cottages

Eaves (insulation at ceiling level) · flanking $\Sigma(U \cdot I)$ entered by hand

SAP / HEM input: enter 0.043 W/(m·K) for junction E10.
SAP Table K1 default 0.12 · notional (Table R2) 0.06 W/(m·K). This detail is 65% below the default: every 10 m of junction removes 0.77 W/K compared with the default.



Material layout



Temperature field

Result	Value
Ψ for SAP	0.043 W/(m·K)
L ₂ D (thermal coupling coefficient)	0.2069 W/(m·K)
Q ₂ D / Q ₁ D = $\Sigma U \cdot I$ (entered by hand)	4.138 / 3.288 W/m
f _{Rsi} (Rsi 0.25, BR 497 / BS EN ISO 13788)	0.908 — PASS (≥ 0.75)
Minimum internal surface temperature	18.16 °C
Convergence	converged · 177 iterations · residual 7.08e-7 · heat balance 1.84e-7 %
Grid · boundary temperatures	62×60 @ 20 mm/cell · Ti 20 °C, Te 0 °C

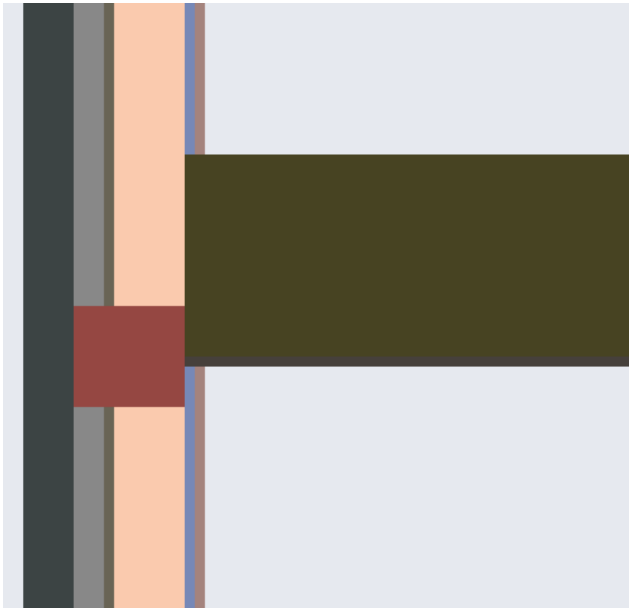
Material	λ W/(m·K)
Mineral wool (glass/rock) + 2% Structural timber	0.0369
Concrete block (medium density)	0.51
Kingspan Thermawall TW55 + 10% Structural timber	0.0328
Cavity closer (insulated)	0.05
50mm air cavity equivalent (Rc 0.18) (50 mm drawn as 60)	0.3336
Plasterboard 12.5mm (12.5 mm drawn as 20)	0.336
OSB/3 (18mm) (9 mm drawn as 20)	0.2889
Air space + 22mm battens (service void) (25 mm drawn as 20)	0.1032
Plasterboard 15mm (15 mm drawn as 20)	0.28

E12 — Ruckford / Malthouse Cottages

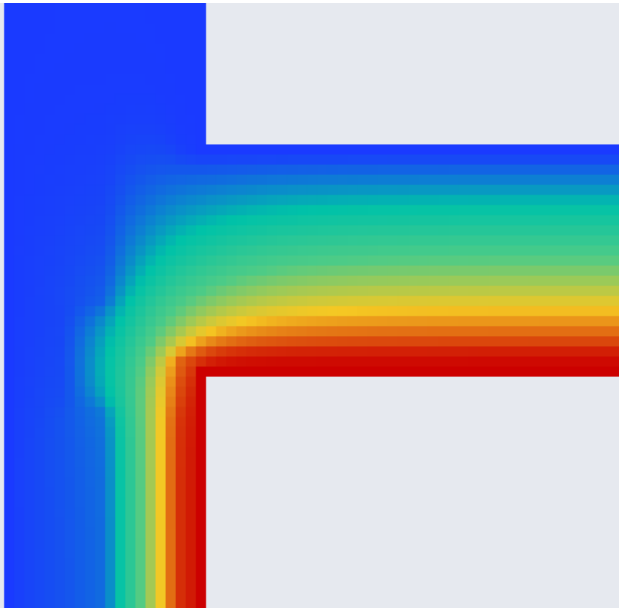
Gable (insulation at ceiling level) · flanking $\Sigma(U\cdot I)$ entered by hand

SAP / HEM input: enter 0.039 W/(m·K) for junction E12.

SAP Table K1 default 0.25 · notional (Table R2) 0.06 W/(m·K). This detail is 84% below the default: every 10 m of junction removes 2.11 W/K compared with the default.



Material layout



Temperature field

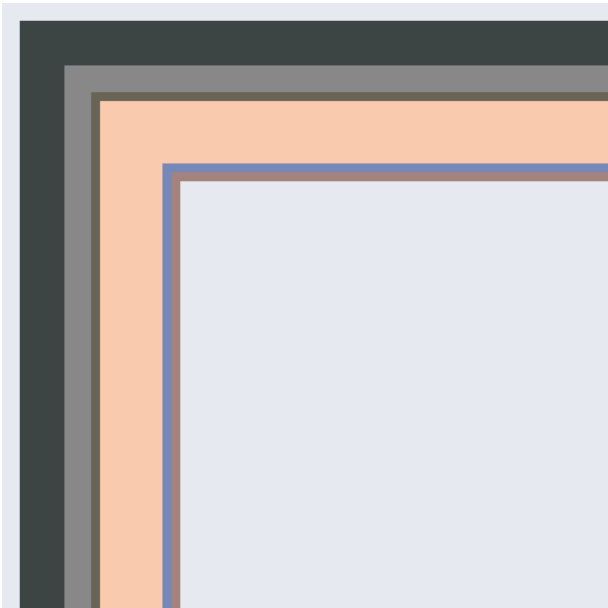
Result	Value
Ψ for SAP	0.039 W/(m·K)
L ₂ D (thermal coupling coefficient)	0.2032 W/(m·K)
Q ₂ D / Q ₁ D = $\Sigma U\cdot I$ (entered by hand)	4.064 / 3.288 W/m
f_Rsi (Rsi 0.25, BR 497 / BS EN ISO 13788)	0.907 — PASS (≥ 0.75)
Minimum internal surface temperature	18.15 °C
Convergence	converged · 184 iterations · residual 9.76e-7 · heat balance 3.33e-5 %
Grid · boundary temperatures	62×60 @ 20 mm/cell · Ti 20 °C, Te 0 °C

Material	λ W/(m·K)
Mineral wool (glass/rock) + 2% Structural timber	0.0369
Kingspan Thermawall TW55 + 10% Structural timber	0.0328
Concrete block (medium density)	0.51
50mm air cavity equivalent (Rc 0.18) (50 mm drawn as 60)	0.3336
Cavity closer (insulated)	0.05
OSB/3 (18mm) (9 mm drawn as 20)	0.2889
Plasterboard 12.5mm (12.5 mm drawn as 20)	0.336
Air space + 22mm battens (service void) (25 mm drawn as 20)	0.1032
Plasterboard 15mm (15 mm drawn as 20)	0.28

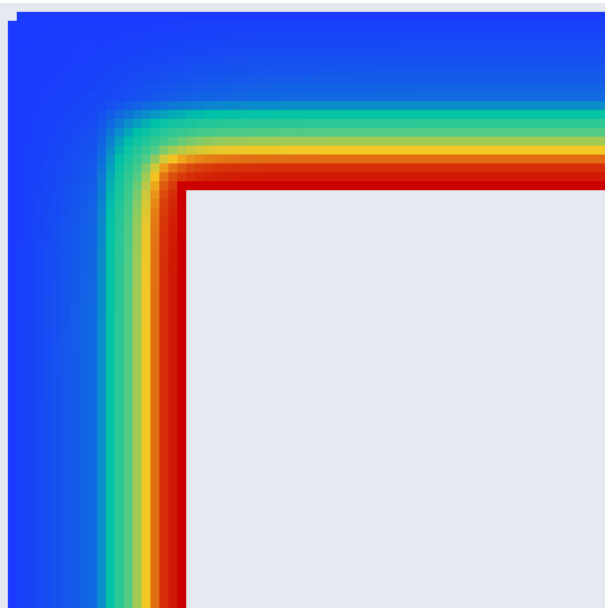
E16 — Ruckford / Malthouse Cottages

Corner (normal) · flanking $\Sigma(U \cdot I)$ entered by hand

SAP / HEM input: enter 0.112 W/(m·K) for junction E16.
SAP Table K1 default 0.18 · notional (Table R2) 0.09 W/(m·K). This detail is 38% below the default: every 10 m of junction removes 0.68 W/K compared with the default.



Material layout



Temperature field

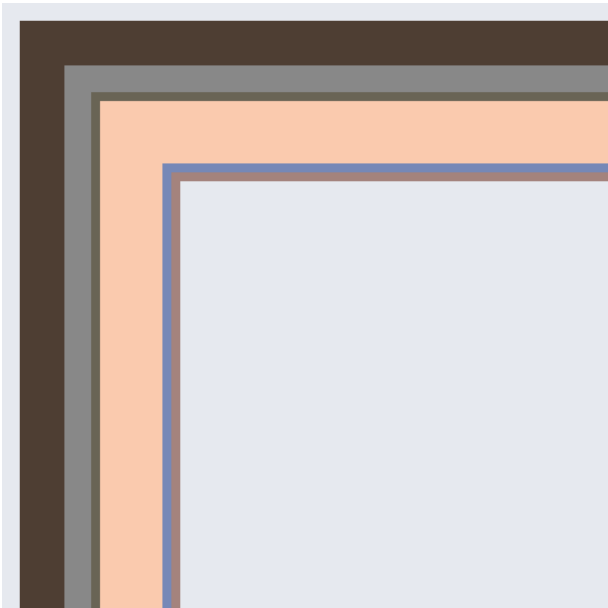
Result	Value
Ψ for SAP	0.112 W/(m·K)
L ₂ D (thermal coupling coefficient)	0.4003 W/(m·K)
Q ₂ D / Q ₁ D = $\Sigma U \cdot I$ (entered by hand)	8.006 / 5.760 W/m
f _{Rsi} (R _{si} 0.25, BR 497 / BS EN ISO 13788)	0.905 — PASS (≥ 0.75)
Minimum internal surface temperature	18.10 °C
Convergence	converged · 192 iterations · residual 9.72e-7 · heat balance 3.91e-5 %
Grid · boundary temperatures	68×68 @ 20 mm/cell · Ti 20 °C, Te 0 °C

Material	λ W/(m·K)
 Kingspan Thermawall TW55 + 10% Structural timber	0.0328
 Concrete block (medium density)	0.51
 50mm air cavity equivalent (R _c 0.18) (50 mm drawn as 60)	0.3336
 OSB/3 (18mm) (9 mm drawn as 20)	0.2889
 Air space + 22mm battens (service void) (25 mm drawn as 20)	0.1032
 Plasterboard 15mm (15 mm drawn as 20)	0.28

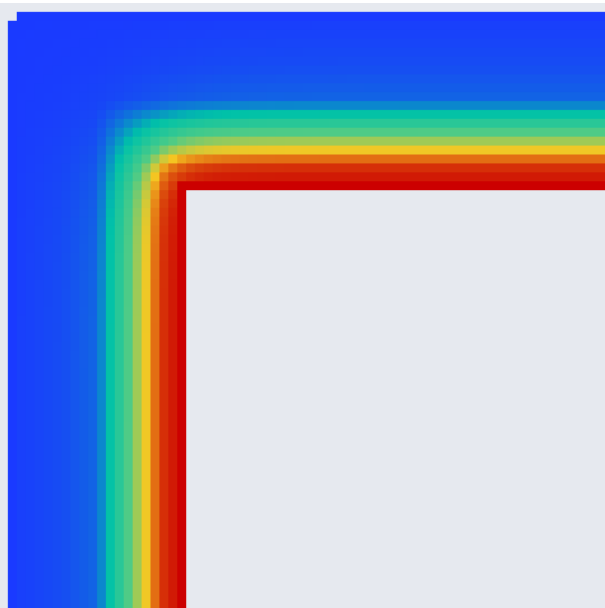
E16 — Ruckford / Malthouse Cottages

Corner (normal) · flanking $\Sigma(U \cdot I)$ entered by hand

SAP / HEM input: enter 0.117 W/(m·K) for junction E16.
SAP Table K1 default 0.18 · notional (Table R2) 0.09 W/(m·K). This detail is 35% below the default: every 10 m of junction removes 0.63 W/K compared with the default.



Material layout



Temperature field

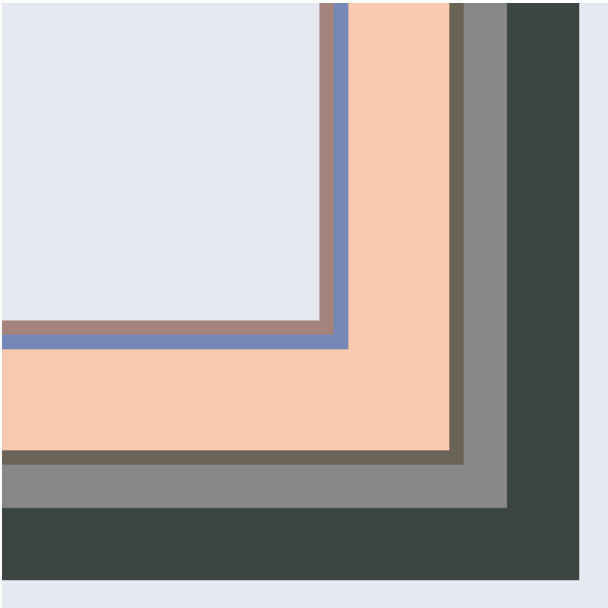
Result	Value
Ψ for SAP	0.117 W/(m·K)
L ₂ D (thermal coupling coefficient)	0.4051 W/(m·K)
Q ₂ D / Q ₁ D = $\Sigma U \cdot I$ (entered by hand)	8.102 / 5.760 W/m
f _{Rsi} (Rsi 0.25, BR 497 / BS EN ISO 13788)	0.904 — PASS (≥ 0.75)
Minimum internal surface temperature	18.08 °C
Convergence	converged · 192 iterations · residual 8.95e-7 · heat balance 7.98e-5 %
Grid · boundary temperatures	68×68 @ 20 mm/cell · Ti 20 °C, Te 0 °C

Material	λ W/(m·K)
 Kingspan Thermawall TW55 + 10% Structural timber	0.0328
 Facing brick	0.77
 50mm air cavity equivalent (Rc 0.18) (50 mm drawn as 60)	0.3336
 OSB/3 (18mm) (9 mm drawn as 20)	0.2889
 Air space + 22mm battens (service void) (25 mm drawn as 20)	0.1032
 Plasterboard 15mm (15 mm drawn as 20)	0.28

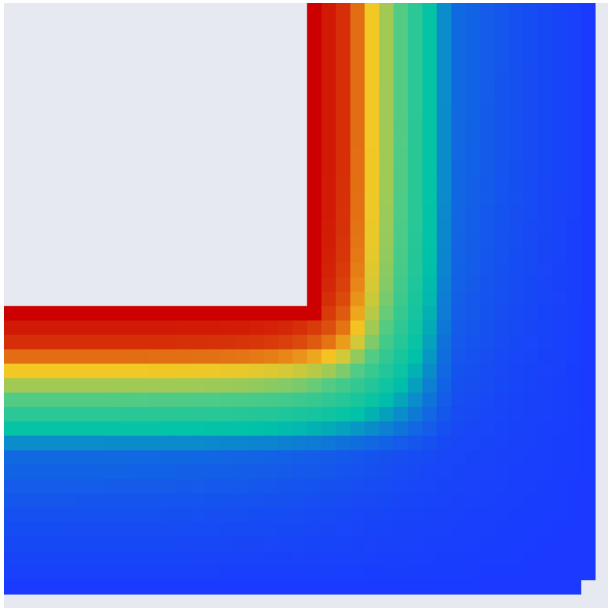
E17 — Ruckford / Malthouse Cottages

Corner (inverted) · flanking $\Sigma(U \cdot I)$ entered by hand

SAP / HEM input: enter -0.042 W/(m·K) for junction E17.
SAP Table K1 default 0.00 · notional (Table R2) -0.09 W/(m·K). This detail is below the default: every 10 m of junction removes 0.42 W/K compared with the default.



Material layout



Temperature field

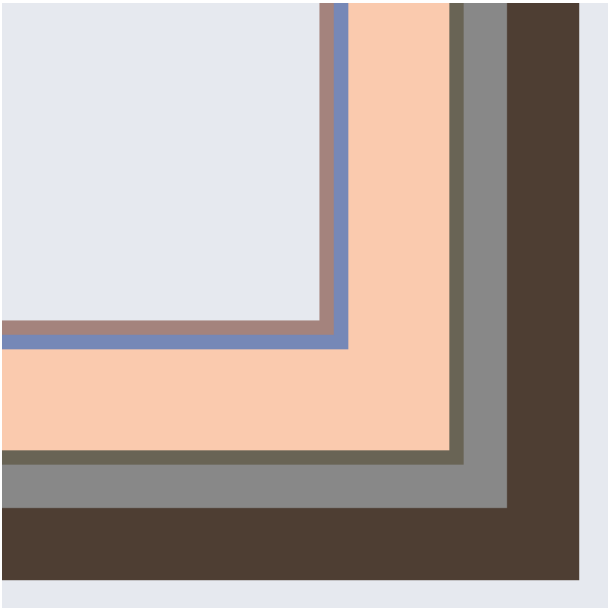
Result	Value
Ψ for SAP	-0.042 W/(m·K)
L ₂ D (thermal coupling coefficient)	0.1983 W/(m·K)
Q ₂ D / Q ₁ D = $\Sigma U \cdot I$ (entered by hand)	3.966 / 4.800 W/m
f _{Rsi} (Rsi 0.25, BR 497 / BS EN ISO 13788)	0.905 — PASS (≥ 0.75)
Minimum internal surface temperature	18.10 °C
Convergence	converged · 130 iterations · residual 8.91e-7 · heat balance 2.86e-5 %
Grid · boundary temperatures	42×42 @ 20 mm/cell · Ti 20 °C, Te 0 °C

Material	λ W/(m·K)
 Kingspan Thermawall TW55 + 10% Structural timber	0.0328
 Concrete block (medium density)	0.51
 50mm air cavity equivalent (Rc 0.18) (50 mm drawn as 60)	0.3336
 OSB/3 (18mm) (9 mm drawn as 20)	0.2889
 Air space + 22mm battens (service void) (25 mm drawn as 20)	0.1032
 Plasterboard 15mm (15 mm drawn as 20)	0.28

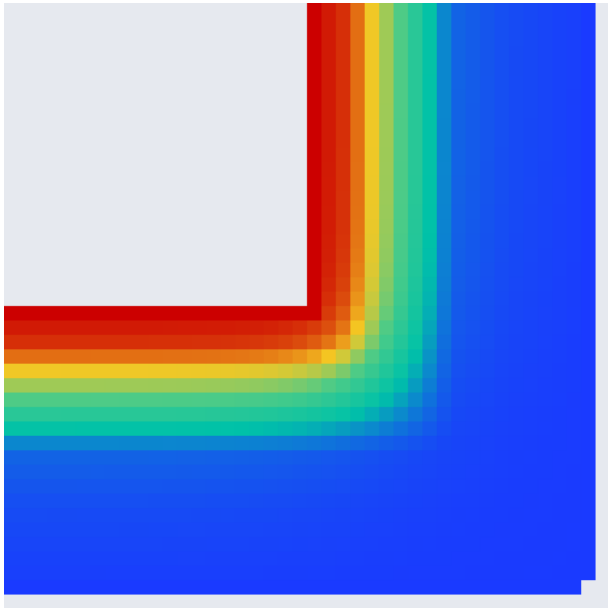
E17 — Ruckford / Malthouse Cottages

Corner (inverted) · flanking $\Sigma(U \cdot I)$ entered by hand

SAP / HEM input: enter -0.040 W/(m·K) for junction E17.
SAP Table K1 default 0.00 · notional (Table R2) -0.09 W/(m·K). This detail is below the default: every 10 m of junction removes 0.40 W/K compared with the default.



Material layout



Temperature field

Result	Value
Ψ for SAP	-0.040 W/(m·K)
L ₂ D (thermal coupling coefficient)	0.2005 W/(m·K)
Q ₂ D / Q ₁ D = $\Sigma U \cdot I$ (entered by hand)	4.009 / 4.800 W/m
f _{Rsi} (Rsi 0.25, BR 497 / BS EN ISO 13788)	0.904 — PASS (≥ 0.75)
Minimum internal surface temperature	18.08 °C
Convergence	converged · 131 iterations · residual 7.14e-7 · heat balance 1.72e-5 %
Grid · boundary temperatures	42×42 @ 20 mm/cell · Ti 20 °C, Te 0 °C

Material	λ W/(m·K)
 Kingspan Thermawall TW55 + 10% Structural timber	0.0328
 Facing brick	0.77
 50mm air cavity equivalent (Rc 0.18) (50 mm drawn as 60)	0.3336
 OSB/3 (18mm) (9 mm drawn as 20)	0.2889
 Air space + 22mm battens (service void) (25 mm drawn as 20)	0.1032
 Plasterboard 15mm (15 mm drawn as 20)	0.28

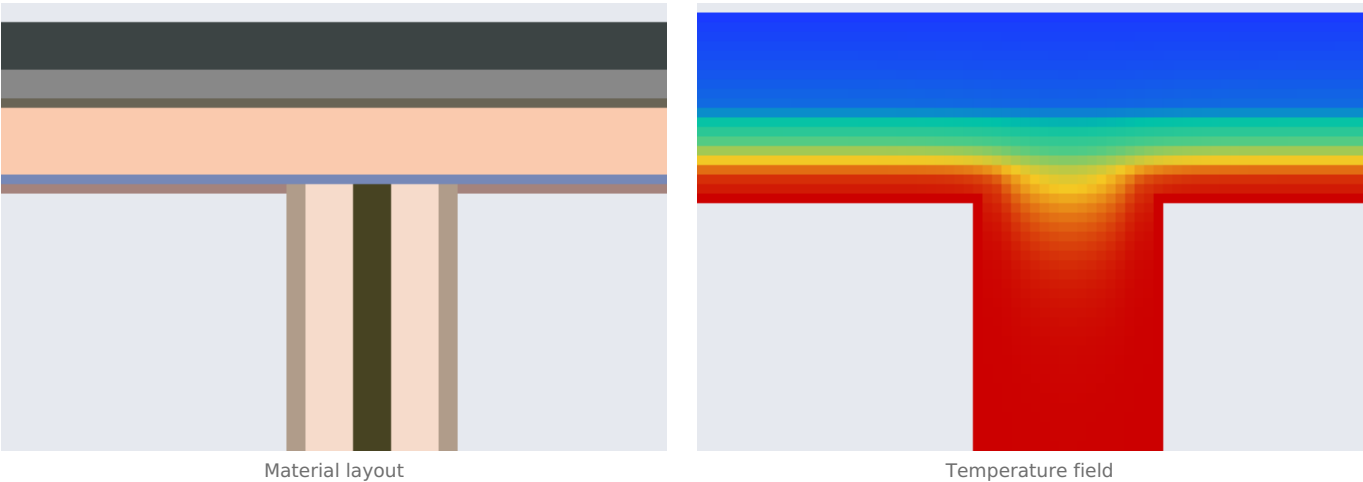
E18 — Ruckford / Malthouse Cottages

Party wall / external wall · flanking $\Sigma(U \cdot I)$ entered by hand

SAP / HEM input: enter 0.052 W/(m·K) for junction E18 in each of the two dwellings.

SAP Table K1 default 0.24 · notional (Table R2) 0.06 W/(m·K). This detail is 78% below the default: every 10 m of junction removes 1.88 W/K compared with the default.

Party-wall junction: whole junction 0.104 W/(m·K), divided equally between the two dwellings (BR 497).



Result	Value
Ψ for SAP (per dwelling)	0.052 W/(m·K)
Ψ whole junction	0.104 W/(m·K)
L_2D (thermal coupling coefficient)	0.2603 W/(m·K)
$Q_2D / Q_1D = \Sigma U \cdot I$ (entered by hand)	5.206 / 3.120 W/m
f_{Rsi} (Rsi 0.25, BR 497 / BS EN ISO 13788)	0.935 — PASS (≥ 0.75)
Minimum internal surface temperature	18.70 °C
Convergence	converged · 202 iterations · residual 9.92e-7 · heat balance 3.96e-6 %
Grid · boundary temperatures	70×47 @ 20 mm/cell · Ti 20 °C, Te 0 °C

Material	λ W/(m·K)
 Kingspan Thermawall TW55 + 10% Structural timber	0.0328
 Concrete block (medium density)	0.51
 Rockwool RWA45 + 13% Structural timber (102.5 mm drawn as 100)	0.0462
 50mm air cavity equivalent (Rc 0.18) (50 mm drawn as 60)	0.3336
 Gyproc SoundBloc (30 mm drawn as 40)	0.3333
 Mineral wool (glass/rock) (70 mm drawn as 80)	0.04
 OSB/3 (18mm) (9 mm drawn as 20)	0.2889
 Air space + 22mm battens (service void) (25 mm drawn as 20)	0.1032
 Plasterboard 15mm (15 mm drawn as 20)	0.28

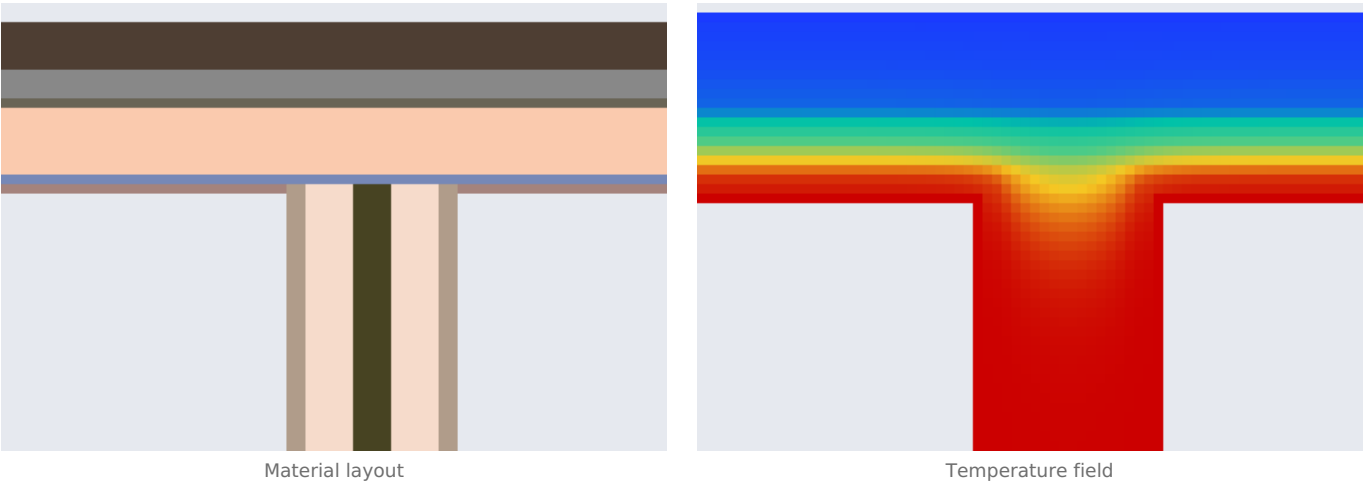
E18 — Ruckford / Malthouse Cottages

Party wall / external wall · flanking $\Sigma(U \cdot I)$ entered by hand

SAP / HEM input: enter 0.054 W/(m·K) for junction E18 in each of the two dwellings.

SAP Table K1 default 0.24 · notional (Table R2) 0.06 W/(m·K). This detail is 78% below the default: every 10 m of junction removes 1.86 W/K compared with the default.

Party-wall junction: whole junction 0.108 W/(m·K), divided equally between the two dwellings (BR 497).



Result	Value
Ψ for SAP (per dwelling)	0.054 W/(m·K)
Ψ whole junction	0.108 W/(m·K)
L_2D (thermal coupling coefficient)	0.2636 W/(m·K)
$Q_2D / Q_1D = \Sigma U \cdot I$ (entered by hand)	5.271 / 3.120 W/m
f_{Rsi} (Rsi 0.25, BR 497 / BS EN ISO 13788)	0.934 — PASS (≥ 0.75)
Minimum internal surface temperature	18.68 °C
Convergence	converged · 203 iterations · residual 8.32e-7 · heat balance 4.53e-5 %
Grid · boundary temperatures	70×47 @ 20 mm/cell · Ti 20 °C, Te 0 °C

Material	λ W/(m·K)
 Kingspan Thermawall TW55 + 10% Structural timber	0.0328
 Facing brick	0.77
 Rockwool RWA45 + 13% Structural timber (102.5 mm drawn as 100)	0.0462
 50mm air cavity equivalent (Rc 0.18) (50 mm drawn as 60)	0.3336
 Gyproc SoundBloc (30 mm drawn as 40)	0.3333
 Mineral wool (glass/rock) (70 mm drawn as 80)	0.04
 OSB/3 (18mm) (9 mm drawn as 20)	0.2889
 Air space + 22mm battens (service void) (25 mm drawn as 20)	0.1032
 Plasterboard 15mm (15 mm drawn as 20)	0.28

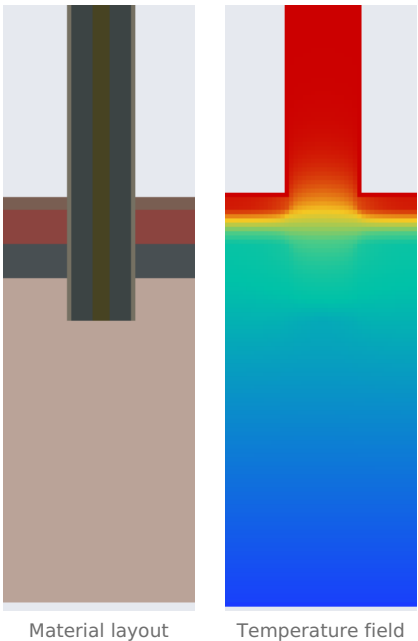
P1 — Ruckford / Malthouse Cottages

Party wall — ground floor · flanking Σ(U·I) entered by hand

SAP / HEM input: enter 0.101 W/(m·K) for junction P1 in each of the two dwellings.

SAP Table K1 default 0.32 · notional (Table R2) 0.08 W/(m·K). This detail is 68% below the default: every 10 m of junction removes 2.19 W/K compared with the default.

Party-wall junction: whole junction 0.202 W/(m·K), divided equally between the two dwellings (BR 497).



Result	Value
Ψ for SAP (per dwelling)	0.101 W/(m·K)
Ψ whole junction	0.202 W/(m·K)
L₂D (thermal coupling coefficient)	0.2772 W/(m·K)
Q₂D / Q₁D = ΣU·I (entered by hand)	5.543 / 1.508 W/m
f_Rsi (Rsi 0.25, BR 497 / BS EN ISO 13788)	0.897 — PASS (≥ 0.75)
Minimum internal surface temperature	17.95 °C
Convergence	converged · 924 iterations · residual 9.89e-7 · heat balance 3.75e-3 %
Grid · boundary temperatures	45×142 @ 20 mm/cell · Ti 20 °C, Te 0 °C

Material	λ W/(m·K)
Soil — sand / gravel (ISO 13370)	2
Concrete block (medium density)	0.51
Mineral wool (glass/rock)	0.035
PIR insulation (foil-faced) (150 mm drawn as 160)	0.0235
Dense aggregate block (150 mm drawn as 160)	1.2053
Gypsum plaster (lightweight) (15 mm drawn as 20)	0.24
Sand/cement screed (1800 kg/m³) (65 mm drawn as 60)	1.0615

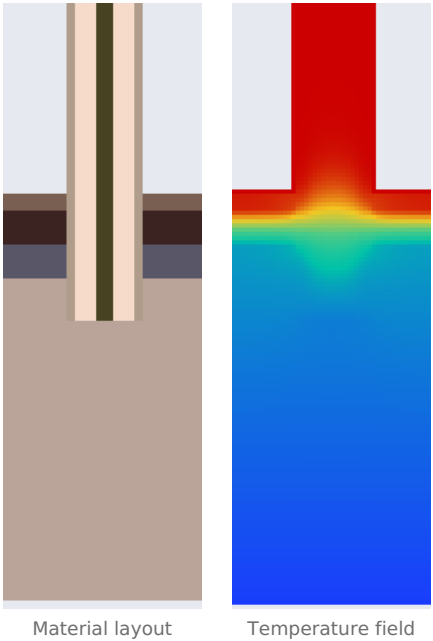
P1 — Ruckford / Malthouse Cottages

Party wall — ground floor · flanking Σ(U·I) entered by hand

SAP / HEM input: enter 0.052 W/(m·K) for junction P1 in each of the two dwellings.

SAP Table K1 default 0.32 · notional (Table R2) 0.08 W/(m·K). This detail is 84% below the default: every 10 m of junction removes 2.68 W/K compared with the default.

Party-wall junction: whole junction 0.104 W/(m·K), divided equally between the two dwellings (BR 497).



Result	Value
Ψ for SAP (per dwelling)	0.052 W/(m·K)
Ψ whole junction	0.104 W/(m·K)
L₂D (thermal coupling coefficient)	0.1791 W/(m·K)
Q₂D / Q₁D = ΣU·I (entered by hand)	3.582 / 1.508 W/m
f_Rsi (Rsi 0.25, BR 497 / BS EN ISO 13788)	0.922 — PASS (≥ 0.75)
Minimum internal surface temperature	18.45 °C
Convergence	converged · 1001 iterations · residual 9.92e-7 · heat balance 5.73e-3 %
Grid · boundary temperatures	47×143 @ 20 mm/cell · Ti 20 °C, Te 0 °C

Material	λ W/(m·K)
Soil — sand / gravel (ISO 13370)	2
Rockwool RWA45 + 13% Structural timber (102.5 mm drawn as 100)	0.0462
Gyproc SoundBloc (30 mm drawn as 40)	0.3333
Mineral wool (glass/rock) (70 mm drawn as 80)	0.04
Celotex GA4000 (150 mm drawn as 160)	0.0235
Dense concrete (2000 kg/m³)	1.35
Sand/cement screed (1800 kg/m³) (75 mm drawn as 80)	1.2267

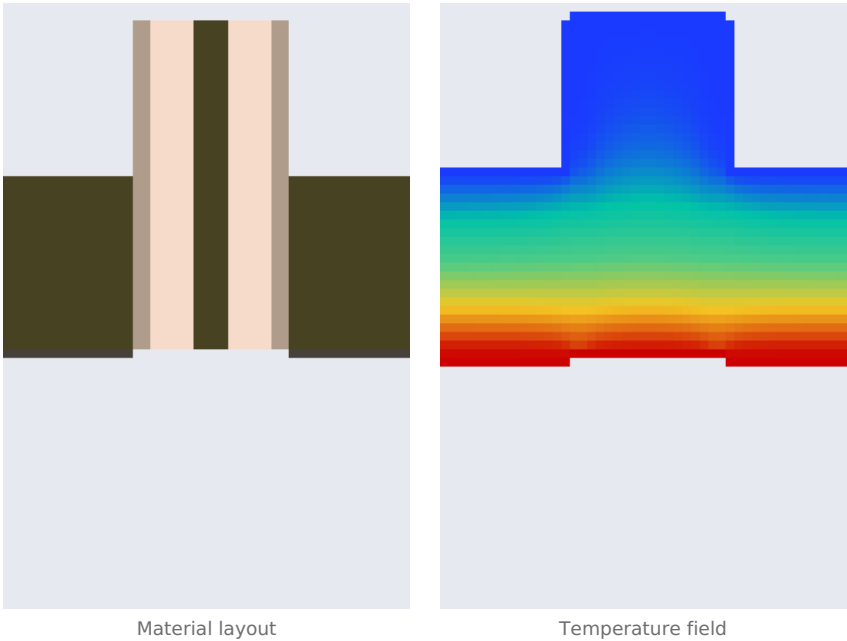
P4 — Ruckford / Malthouse Cottages

Party wall — roof (insulation at ceiling) · flanking Σ(U·I) entered by hand

SAP / HEM input: enter 0.036 W/(m·K) for junction P4 in each of the two dwellings.

SAP Table K1 default 0.48 · notional (Table R2) 0.12 W/(m·K). This detail is 92% below the default: every 10 m of junction removes 4.44 W/K compared with the default.

Party-wall junction: whole junction 0.072 W/(m·K), divided equally between the two dwellings (BR 497).



Result	Value
Ψ for SAP (per dwelling)	0.036 W/(m·K)
Ψ whole junction	0.072 W/(m·K)
L ₂ D (thermal coupling coefficient)	0.1361 W/(m·K)
Q ₂ D / Q ₁ D = ΣU·I (entered by hand)	2.721 / 1.276 W/m
f _R si (Rsi 0.25, BR 497 / BS EN ISO 13788)	0.890 — PASS (≥ 0.75)
Minimum internal surface temperature	17.80 °C
Convergence	converged · 197 iterations · residual 9.21e-7 · heat balance 3.16e-5 %
Grid · boundary temperatures	47×70 @ 20 mm/cell · Ti 20 °C, Te 0 °C

Material	λ W/(m·K)
 Mineral wool (glass/rock) + 2% Structural timber	0.0369
 Rockwool RWA45 + 13% Structural timber (102.5 mm drawn as 100)	0.0462
 Gyproc SoundBloc (30 mm drawn as 40)	0.3333
 Mineral wool (glass/rock) (70 mm drawn as 80)	0.04
 Plasterboard 12.5mm (12.5 mm drawn as 20)	0.336

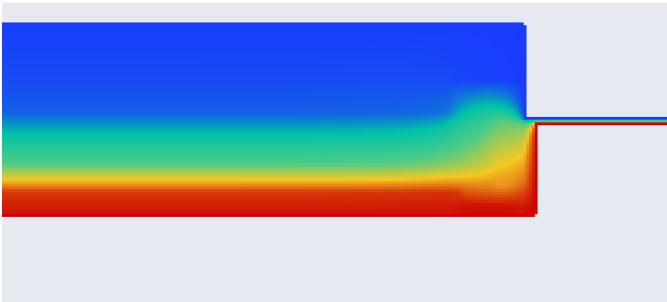
E4 | AD412 W3 | WINDOW JAMB | 70mm PIR CLOSER + 30mm

flanking Σ(U·I) entered by hand

SAP / HEM input: enter -0.065 W/(m·K) for junction E4 | AD412 W3 | WINDOW JAMB | 70mm PIR CLOSER + 30mm
INSULATED REVEAL LINING | Uw 1.30 | ASSUMED CONTINUITY | fRsi PASS.



Material layout



Temperature field

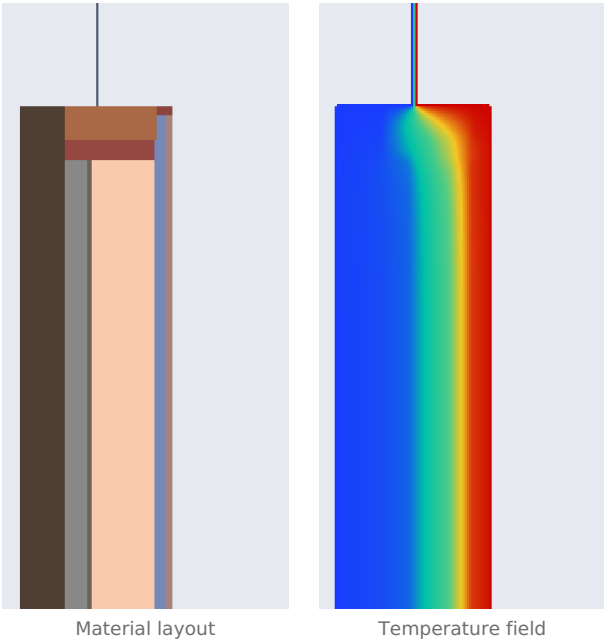
Result	Value
Ψ for SAP	-0.065 W/(m·K)
L2D (thermal coupling coefficient)	0.5405 W/(m·K)
Q2D / Q1D = ΣU·I (entered by hand)	10.810 / 12.100 W/m
f_Rsi (Rsi 0.25, BR 497 / BS EN ISO 13788)	0.757 — PASS (≥ 0.75)
Minimum internal surface temperature	15.14 °C
Convergence	converged · 645 iterations · residual 9.46e-7 · heat balance 6.72e-6 %
Grid · boundary temperatures	240×108 @ 5 mm/cell · Ti 20 °C, Te 0 °C

Material	λ W/(m·K)
Facing brick	0.77
Kingspan Thermawall TW55 + 15% Structural timber	0.0382
Kingspan Thermawall TW55	0.022
50mm air cavity equivalent (Rc 0.18)	0.278
Air space + 22mm battens (service void)	0.129
Plasterboard 15mm	0.21
PIR board (generic)	0.022
OSB/3 (18mm) (9 mm drawn as 10)	0.1444
Structural timber	0.13
PIR insulation (foil-faced)	0.022
Sealed glazed unit (double)	R 0.54 m²K/W per cell

E3 | AD412 W4 | WINDOW SILL | AS-BUILT WALL | 50mm PIR

flanking Σ(U·I) entered by hand

SAP / HEM input: enter -0.059 W/(m·K) for junction E3 | AD412 W4 | WINDOW SILL | AS-BUILT WALL | 50mm PIR
CONTINUOUS UNDER CILL | Uw 1.30 | ASSUMED CONTINUITY | fRsi PASS.



Result	Value
Ψ for SAP	-0.059 W/(m·K)
L2D (thermal coupling coefficient)	0.5463 W/(m·K)
Q2D / Q1D = ΣU·I (entered by hand)	10.926 / 12.100 W/m
f_Rsi (Rsi 0.25, BR 497 / BS EN ISO 13788)	0.760 — PASS (≥ 0.75)
Minimum internal surface temperature	15.19 °C
Convergence	converged · 722 iterations · residual 9.97e-7 · heat balance 2.13e-5 %
Grid · boundary temperatures	128×270 @ 5 mm/cell · Ti 20 °C, Te 0 °C

Material	λ W/(m·K)
Facing brick	0.77
Kingspan Thermawall TW55 + 15% Structural timber	0.0382
50mm air cavity equivalent (Rc 0.18)	0.278
Kingspan Thermawall TW55	0.022
Air space + 22mm battens (service void)	0.129
Plasterboard 15mm	0.21
PIR board (generic)	0.022
OSB/3 (18mm) (9 mm drawn as 10)	0.1444
Cavity closer (insulated)	0.05
Sealed glazed unit (double)	R 0.54 m²K/W per cell
PIR insulation (foil-faced)	0.022