A Handbook of thermal bridging details incorporating aircrete blocks

Book 3 — Thermal bridging solutions for externally insulated solid wall details

Prepared for the *Aircrete Products Association*

by the *BBA* and *RDL*

Constructive Details Ltd
Bucknalls Lane,
Watford
Hertfordshire WD25 9BA

t: + 44 (0)1923 665300
f: + 44 (0)1923 665301

e: enquiries@constructivedetails.co.uk
w: www.constructivedetails.co.uk

Issued: 16 October 2013

Table of Contents

Purpose of the handbook

This handbook is an extension to the original handbook of Constructive Details that was issued in June 2012 (Book 1) and the subsequent handbook (Book 2), issued in January 2013 for the Aircrete Products Association (APA can be contacted at www.aircrete.co.uk). The thermal bridging details in this book are for a solid wall with external wall insulation. The new details correspond to details CD0001 to CD0016 of the first handbook and CD0022 to CD0037 of the second handbook, with minor changes. The drawings provided are for typical details and show all the elements essential in achieving the calculated ψ-values. All other site requirements and all relevant building regulations must be taken into consideration when implementing the details.

Each detail in this handbook includes drawings of the junction, ψ-values calculated by an experienced thermal modeller and a process checklist for use on site to facilitate the achievement of the calculated ψ-values.

A more detailed description for each section of a Constructive Detail can be found in the original Guidance Note.

List of Constructive Details

There are a total of 15 details, labelled CD0038 to CD0052 with their corresponding E number as per the latest version of the SAP conventions document, to assist Energy Assessors in identifying the relevant junctions.

The Handbook details aircrete blocks for three different conductivity values of 0.11 $W \cdot m^{-1} \cdot K^{-1}$, 0.15 $W \cdot m^{-1} \cdot K^{-1}$ and 0.19 $W \cdot m^{-1} \cdot K^{-1}$. Other APA blocks with intermediate thermal conductivity values or lower than 0.11 (for example 0.09 $W \cdot m^{-1} \cdot K^{-1}$) could also be used without significantly affecting the ψ-values provided. In the vast majority of cases, this would constitute the worst case scenario. As with the first two handbooks, only aircrete blocks manufactured by the members of the APA may be used. Where aircrete blocks are used in contact with the ground, the thermal conductivity has been adjusted for a higher moisture content, and consideration given to the strength of the blocks and their relative thermal conductivity.

This handbook begins with the ground floor junctions, moving on to lintels and windows, intermediate floor and roof, corner and a party wall with an external wall. Where the junction is for a separating wall between dwellings, the ψ-values should be applied to each dwelling.

Detail number	Detail title	SAP Ref
CD0038	Solid Externally Insulated Wall Suspended beam-and-block floor — Insulation above slab	E5
CD0039	Solid Externally Insulated Wall Suspended in-situ concrete floor — Insulation below slab	E5
CD0040	Solid Externally Insulated Wall Concrete ground bearing floor — Insulation below slab	E5
CD0041	Solid Externally Insulated Wall Steel lintel	E1
CD0042	Solid Externally Insulated Wall Sill	E3
CD0043	Solid Externally Insulated Wall Jamb	E4
CD0044	Solid Externally Insulated Wall Intermediate timber floor within a dwelling	E6
CD0045	Solid Externally Insulated Wall Precast concrete separating floor between dwellings	E7
CD0046	Solid Externally Insulated Wall Pitched roof. Gable — Insulation at ceiling level — Ventilated loft	E12
CD0047	Solid Externally Insulated Wall Pitched roof. Gable — Insulation at rafter level — Unventilated rafter void	E13
CD0048	Solid Externally Insulated Wall Pitched roof. Eaves — Insulation at ceiling level — Ventilated loft	E10
CD0049	Solid Externally Insulated Wall Pitched roof. Eaves — Insulation at rafter level — Unventilated rafter void	E11
CD0050	Solid Externally Insulated Wall Normal corner	E16
CD0051	Solid Externally Insulated Wall Inverted corner	E17
CD0052	Solid Externally Insulated Wall Party wall between dwellings	E18

How to use this handbook

As with the other two handbooks, the details have been prepared taking into consideration the range of U values appropriate to achieve compliance within The Building Regulations 2010 (England and Wales) (as amended), Part L. Therefore all of the building elements have an upper U value limit of 0.30 $W \cdot m^{-2} \cdot K^{-1}$ for a wall, 0.25 $W \cdot m^{-2} \cdot K^{-1}$ for a floor and 0.20 $W \cdot m^{-2} \cdot K^{-1}$ for the roof element, in line with the limiting fabric parameters given in Approved Document L1A.

The ψ-values are provided for different bands of U values. For each band the ψ-value is calculated for the worst case after considering the effect of thickness and conductivity of insulation independently. This ψ-value can therefore be taken for the complete range of U values quoted.

In all of the details the internal wall finish drawn is plasterboard on dabs. This was chosen for consistency across all three handbooks and as it is a common construction method. It is not, however, essential to use this internal finish solution to achieve the stated ψ-value. Both plastic and metal profiles in the ground floor junctions have been modelled and the values for both options are provided in the details. The calculations are valid for a block width of up to 215 mm and the example calculations show examples of 200 mm thick aircrete blocks. It is also noted that care must be taken with regards to the Regulatory requirements relating to the combustibility of the insulation and the need to use fire stops, where applicable and also with regards to the insulation below the dpc being fit for purpose for use below the ground. The external finish is shown as render, but other types of cladding (timber for example) over the insulation may be used if the fixings are taken into account in the calculation of the wall U value.

As a general rule, unless a specific solution for a wall or floor finish is either indicated in the Notes section or is explicitly mentioned in the annotations, it should be considered optional. The main driver in selecting the materials for each detail would be to achieve the U value bands as provided in each detail.

Some basic guidance on how to achieve air tightness is also provided. As a general rule, acceptable barrier options are the use of plaster coat/parging coat applied to the internal face with plasterboard over, or plasterboard on dabs. Where plasterboard on dabs is used, a continuous ribbon of adhesive should also be applied around all openings, along the top and bottom of the wall and at internal and external corners. In general, all penetrations through the air barrier should be sealed with a flexible sealant. This type of guidance can also be found in the current Accredited Construction Details, available at the DCLG portal.

Acoustic performance

A further parameter that was considered in the preparation of the details was the acoustic performance of the junctions, as with the first two handbooks. In this handbook the only applicable detail is CD0052. Where appropriate, advice was provided by RDL to establish that the details could be followed without compromising the acoustic performance in terms of the RDL scheme.

Terms and conditions

Please refer to www.constructivedetails.co.uk for full terms and conditions.

You may not edit or amend the contents or format or otherwise incorporate them into any other publication or work or media.

Constructive Details Ltd
Bucknalls Lane,
Watford
Hertfordshire WD25 9BA

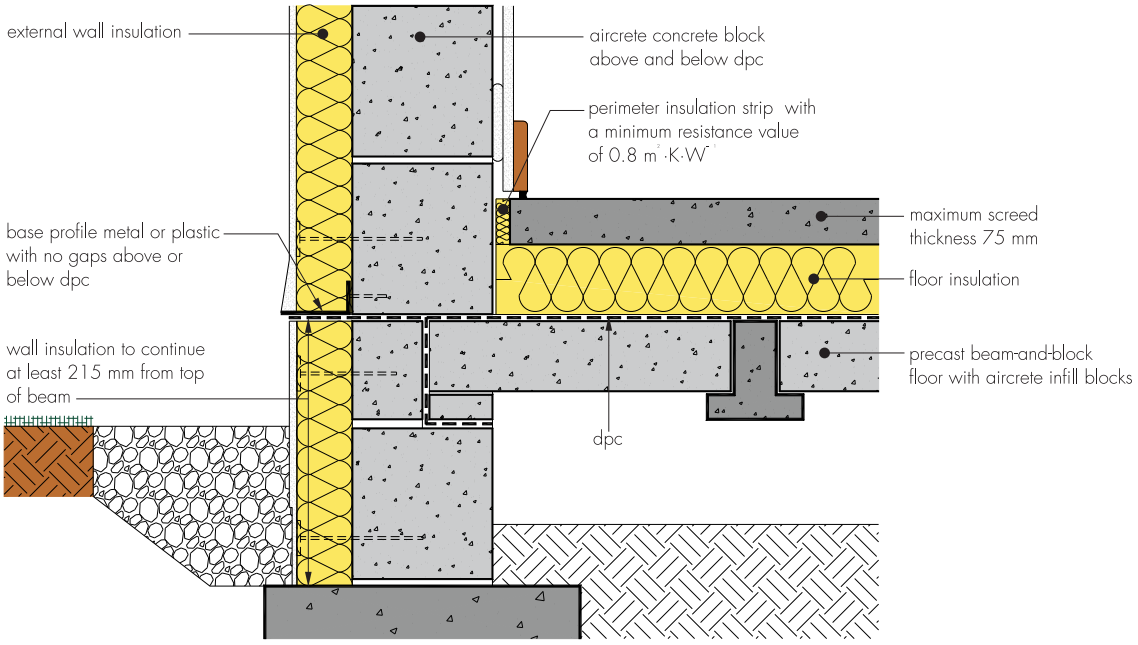
t: + 44 (0)1923 665300
f: + 44 (0)1923 665301

e: enquiries@constructivedetails.co.uk
w: www.constructivedetails.co.uk

Solid Externally Insulated Wall

Suspended beam-and-block floor — Insulation above slab

CD0038



This indicative guidance illustrates good practice for design and construction with respect to achieving thermal performance and air barrier continuity only. It must be implemented taking due regard of site conditions and all other requirements imposed by Building Regulations.

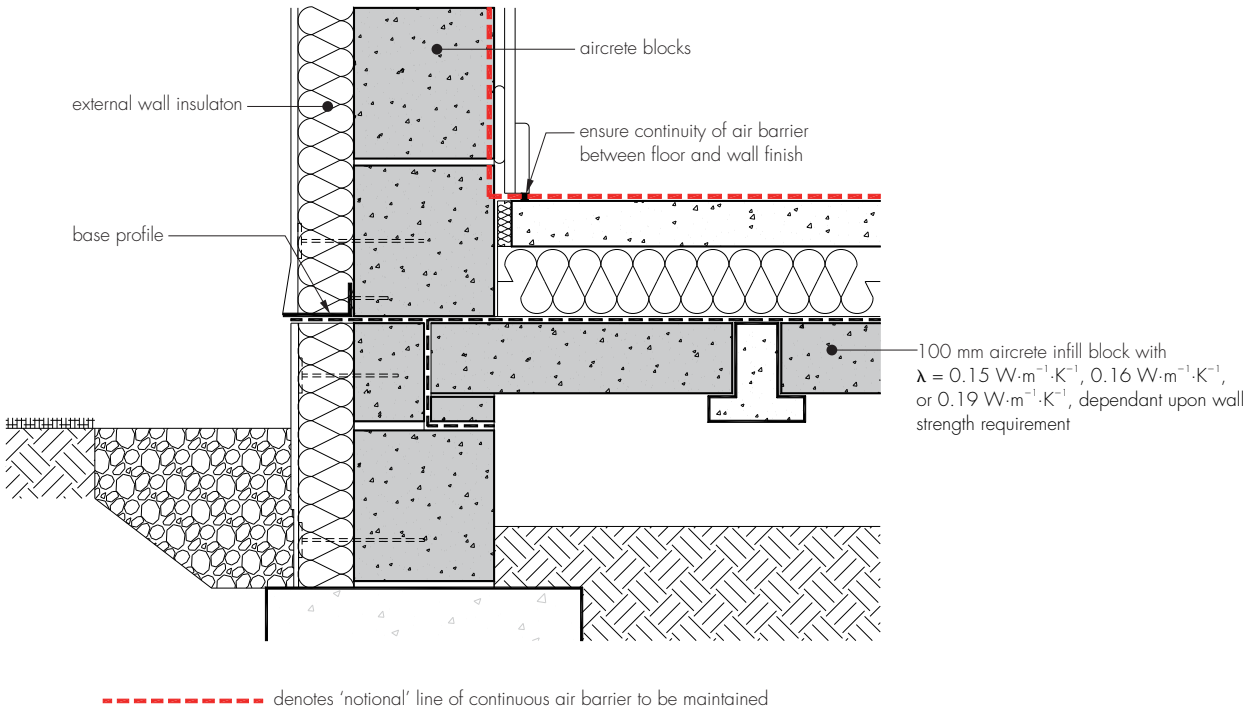
Notes

- perimeter insulation strip with a minimum resistance value of 0.8 $m^2 \cdot K \cdot W^{-1}$ (eg 20 mm of insulation with λ = 0.025 $W \cdot m^{-1} \cdot K^{-1}$) and installed up to top of floor finish
- maximum screed thickness 75 mm
- wall insulation below dpc to continue at least 215 mm from the top of the floor beam
- wall insulation below dpc with a maximum conductivity of 0.038 $W \cdot m^{-1} \cdot K^{-1}$
- base profile of metal or plastic, and with no gap between main wall insulation and insulation below dpc
- ensure that the wall insulation below the dpc is fit for purpose with regards to water absorption and of equal thickness to the external wall insulation
- install a vapour control layer in the warm side of the floor insulation if required by BS 5250 : 2011
- ensure that the floor insulation tightly abuts blockwork wall
- ensure that the external wall insulation fits tightly against the blocks, ensuring that there are no gaps
- ensure there is a seal between the wall and the floor air barrier, and that there are no gaps between skirting board and the floor
- other improved air barrier continuity solutions can be used.

Issued: 16 October 2013

Solid Externally Insulated Wall
Suspended beam-and-block floor — Insulation above slab

CD0038



This indicative guidance illustrates good practice for design and construction with respect to achieving thermal performance and air barrier continuity only. It must be implemented taking due regard of site conditions and all other requirements imposed by Building Regulations.

Calculated ψ-values for this detail(1)

A. Metal base profile

	Wall U value less than or equal to 0.20 W·m⁻²·K⁻¹		Wall U value between 0.21 and 0.25 W·m⁻²·K⁻¹		Wall U value between 0.26 and 0.30 W·m⁻²·K⁻¹	
Solid wall block conductivity (W·m⁻¹·K⁻¹)	ψ-value (W·m⁻¹·K⁻¹)	Temperature factor	ψ-value (W·m⁻¹·K⁻¹)	Temperature factor	ψ-value (W·m⁻¹·K⁻¹)	Temperature factor
0.19	0.095	0.93	0.099	0.92	0.090	0.92
0.15	0.083	0.93	0.081	0.92	0.077	0.92
0.11	0.067	0.93	0.068	0.93	0.065	0.92

B. Plastic base profile

	Wall U value less than or equal to 0.20 W·m⁻²·K⁻¹		Wall U value between 0.21 and 0.25 W·m⁻²·K⁻¹		Wall U value between 0.26 and 0.30 W·m⁻²·K⁻¹	
Solid wall block conductivity (W·m⁻¹·K⁻¹)	ψ-value (W·m⁻¹·K⁻¹)	Temperature factor	ψ-value (W·m⁻¹·K⁻¹)	Temperature factor	ψ-value (W·m⁻¹·K⁻¹)	Temperature factor
0.19	0.082	0.93	0.081	0.93	0.081	0.92
0.15	0.071	0.93	0.071	0.93	0.071	0.92
0.11	0.062	0.93	0.061	0.93	0.060	0.93

These values are valid for a floor U value less than or equal to 0.25 W·m⁻²·K⁻¹.

Solid Externally Insulated Wall
Suspended beam-and-block floor — Insulation above slab

CD0038

In all the example calculations, external wall insulation fixings are stainless steel, 7 per m^2, diameter of 8 mm with 200 mm aircrete blocks.

Examples of constructions achieving these U values are:

Floor U values $\leqslant 0.25\ W \cdot m^{-2} \cdot K^{-1}$ (for a perimeter/area ratio $\leqslant 1$) can be achieved with:
— 60 mm or thicker insulation with $\lambda \leqslant 0.023\ W \cdot m^{-1} \cdot K^{-1}$

Wall U values $\leqslant 0.30\ W \cdot m^{-2} \cdot K^{-1}$ can be achieved with:
— 95 mm $\leqslant$ insulation thickness $\leqslant$ 115 mm with $\lambda \leqslant 0.036\ W \cdot m^{-1} \cdot K^{-1}$

Wall U values $\leqslant 0.25\ W \cdot m^{-2} \cdot K^{-1}$ can be achieved with:
— 120 mm $\leqslant$ insulation thickness $\leqslant$ 150 mm with $\lambda \leqslant 0.036\ W \cdot m^{-1} \cdot K^{-1}$

Wall U values $\leqslant 0.20\ W \cdot m^{-2} \cdot K^{-1}$ can be achieved with:
— 160 mm minimum insulation thickness with $\lambda \leqslant 0.036\ W \cdot m^{-1} \cdot K^{-1}$.

(1) These values are valid for the case of beams parallel to the junction. For the case of beams perpendicular to the junction, the ψ-values provided can also be adopted, as the difference is not significant, particularly for lower U values.

Solid Externally Insulated Wall
Suspended beam-and-block floor — Insulation above slab

CD0038

Guidance checklist

Date: ..... Site manager/supervisor: .....

Site name: ..... Plot No: .....

Ref	Item	Yes/No Inspected (initials and date)
1	Is the edge insulation as specified? — Minimum resistance of 0.8 $m^2 \cdot K^1 \cdot W^{-1}$ (eg 20 mm of insulation with λ = 0.025 $W \cdot m^{-1} \cdot K^{-1}$) — Installed up to top of floor finish.	☐ ☐ ..... ☐ ☐ .....
2	Is the external wall insulation below the dpc continued at least 215 mm below top of beams?	☐ ☐ .....
3	Is the insulation below the dpc the same thickness as the external wall insulation?	☐ ☐ .....
4	Is the conductivity of the insulation below the dpc equal to or less than 0.038 $W \cdot m^{-1} \cdot K^{-1}$?	☐ ☐ .....
5	Is there no gap between main wall insulation and the insulation below the dpc?	☐ ☐ .....
6	Is the external wall insulation below the dpc appropriate for moisture?	☐ ☐ .....
7	Is the screed a maximum thickness of 75 mm?	☐ ☐ .....
8	Is the floor insulation firmly against the blockwork wall leaving no gaps?	☐ ☐ .....
9	Is the external wall insulation fitted tightly against the blocks with no gaps?	☐ ☐ .....
10	Is the continuity of the air barrier between the floor and the wall achieved? If not, please provide details.	☐ ☐ .....

Notes (include details of any corrective action)

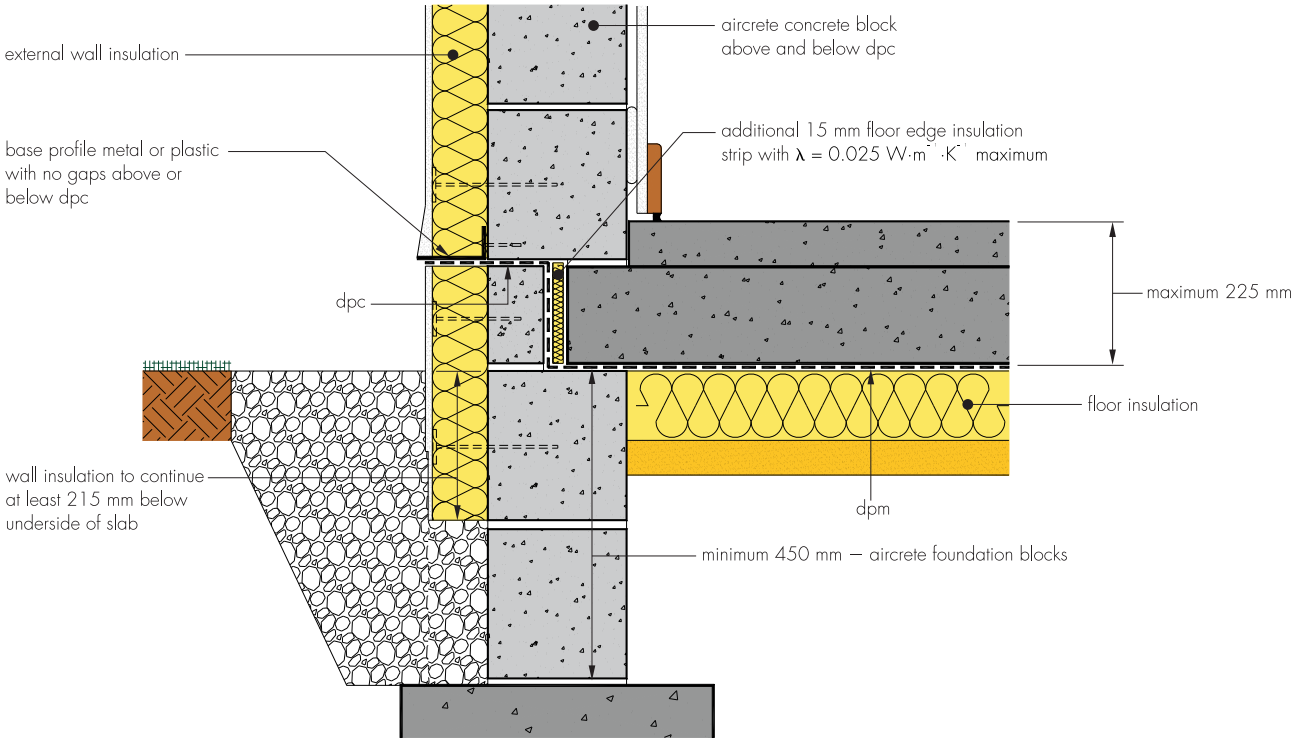
Constructive Details Ltd
Bucknalls Lane,
Watford
Hertfordshire WD25 9BA

t: + 44 (0)1923 665300
f: + 44 (0)1923 665301
e: enquiries@constructivedetails.co.uk
w: www.constructivedetails.co.uk

Solid Externally Insulated Wall

Suspended in-situ concrete floor — Insulation below slab

CD0039



This indicative guidance illustrates good practice for design and construction with respect to achieving thermal performance and air barrier continuity only. It must be implemented taking due regard of site conditions and all other requirements imposed by Building Regulations.

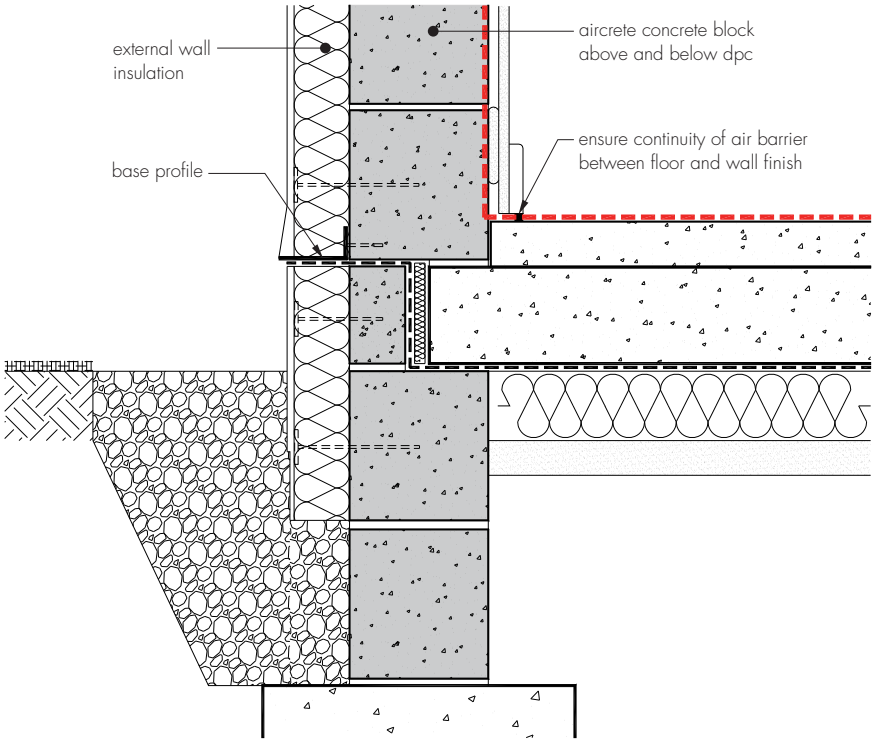
Notes

- minimum 450 mm — aircrete foundation blocks
- maximum 225 mm concrete floor slab (including floor finish)
- external wall insulation below the dpc to continue at least 215 mm below underside of slab
- wall insulation below dpc with a maximum conductivity of 0.038 $W \cdot m^{-1} \cdot K^{-1}$
- base profile of metal or plastic, and with no gap between main wall insulation and insulation below dpc
- additional 15 mm floor edge insulation strip with a maximum λ = 0.025 $W \cdot m^{-1} \cdot K^{-1}$
- install a vapour control layer in the warm side of the floor insulation if required by BS 5250 : 2011
- ensure that the floor insulation tightly abuts the blockwork wall
- ensure that the wall insulation below the dpc is fit for purpose with regards to water absorption and of equal thickness to the external wall insulation
- ensure that the floor insulation is fit for purpose with regards to water absorption
- ensure that the external wall insulation fits tightly against the blocks, ensuring that there are no gaps
- ensure there is a seal between the wall and the floor air barrier, and that there are no gaps between skirting board and the floor
- other improved air barrier continuity solutions can be used.

Issued: 16 October 2013

Solid Externally Insulated Wall
Suspended in-situ concrete floor — Insulation below slab

CD0039



denotes 'notional' line of continuous air barrier to be maintained

This indicative guidance illustrates good practice for design and construction with respect to achieving thermal performance and air barrier continuity only. It must be implemented taking due regard of site conditions and all other requirements imposed by Building Regulations.

Calculated ψ-values for this detail

Case 1: Floor U value between 0.08 and 0.11 W·m^{-2}·K^{-1} (for a perimeter/area ratio of 0.25)

For example, floor U values for the range shown above can be achieved with insulation thickness between 130 mm and 200 mm and with $\lambda \leqslant 0.023$ W·m^{-1}·K^{-1}.

A. Metal base profile

	Wall U value less than or equal to 0.20 W·m^{-2}·K^{-1}		Wall U value between 0.21 and 0.25 W·m^{-2}·K^{-1}		Wall U value between 0.26 and 0.30 W·m^{-2}·K^{-1}	
Solid wall block conductivity (W·m^{-1}·K^{-1})	ψ-value (W·m^{-1}·K^{-1})	Temperature factor	ψ-value (W·m^{-1}·K^{-1})	Temperature factor	ψ-value (W·m^{-1}·K^{-1})	Temperature factor
0.19	0.212	0.88	0.223	0.87	0.232	0.86
0.15	0.192	0.88	0.196	0.88	0.205	0.87
0.11	0.186	0.89	0.192	0.88	0.203	0.87

B. Plastic base profile

	Wall U value less than or equal to 0.20 W·m^{-2}·K^{-1}		Wall U value between 0.21 and 0.25 W·m^{-2}·K^{-1}		Wall U value between 0.26 and 0.30 W·m^{-2}·K^{-1}	
Solid wall block conductivity (W·m^{-1}·K^{-1})	ψ-value (W·m^{-1}·K^{-1})	Temperature factor	ψ-value (W·m^{-1}·K^{-1})	Temperature factor	ψ-value (W·m^{-1}·K^{-1})	Temperature factor
0.19	0.181	0.89	0.192	0.88	0.208	0.87
0.15	0.162	0.90	0.175	0.89	0.186	0.88
0.11	0.166	0.89	0.177	0.89	0.192	0.88

The Table below provides U values for the same floor construction for P/A ratios other than 0.25. The ψ-values can only be used when the actual floor U value is less than that given for the P/A ratio relevant to the dwelling in question:

P/A ($m \cdot m^{-2}$)	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00
U ($W \cdot m^{-2} \cdot K^{-1}$)	0.11	0.11	0.12	0.12	0.13	0.13	0.13	0.13	0.13	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14

Case 2: Floor U value between 0.12 and 0.19 $W \cdot m^{-2} \cdot K^{-1}$ (for a perimeter/area ratio of 0.25)

For example, floor U values for the range shown above can be achieved with insulation thickness between 50 mm and 125 mm and with $\lambda \leqslant 0.023\ W \cdot m^{-1} \cdot K^{-1}$.

A. Metal base profile

	Wall U value less than or equal to 0.20 $W \cdot m^{-2} \cdot K^{-1}$		Wall U value between 0.21 and 0.25 $W \cdot m^{-2} \cdot K^{-1}$		Wall U value between 0.26 and 0.30 $W \cdot m^{-2} \cdot K^{-1}$	
Solid wall block conductivity ($W \cdot m^{-1} \cdot K^{-1}$)	ψ-value ($W \cdot m^{-1} \cdot K^{-1}$)	Temperature factor	ψ-value ($W \cdot m^{-1} \cdot K^{-1}$)	Temperature factor	ψ-value ($W \cdot m^{-1} \cdot K^{-1}$)	Temperature factor
0.19	0.208	0.87	0.213	0.86	0.221	0.85
0.15	0.184	0.88	0.187	0.87	0.195	0.87
0.11	0.177	0.88	0.184	0.87	0.194	0.86

B. Plastic base profile

	Wall U value less than or equal to 0.20 $W \cdot m^{-2} \cdot K^{-1}$		Wall U value between 0.21 and 0.25 $W \cdot m^{-2} \cdot K^{-1}$		Wall U value between 0.26 and 0.30 $W \cdot m^{-2} \cdot K^{-1}$	
Solid wall block conductivity ($W \cdot m^{-1} \cdot K^{-1}$)	ψ-value ($W \cdot m^{-1} \cdot K^{-1}$)	Temperature factor	ψ-value ($W \cdot m^{-1} \cdot K^{-1}$)	Temperature factor	ψ-value ($W \cdot m^{-1} \cdot K^{-1}$)	Temperature factor
0.19	0.174	0.88	0.183	0.87	0.198	0.86
0.15	0.155	0.89	0.167	0.88	0.177	0.87
0.11	0.159	0.89	0.170	0.88	0.183	0.87

The Table below provides U values for the same floor construction for P/A ratios other than 0.25. The ψ-values can only be used when the actual floor U value is less than that given for the P/A ratio relevant to the dwelling in question:

P/A ($m \cdot m^{-2}$)	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00
U ($W \cdot m^{-2} \cdot K^{-1}$)	0.18	0.19	0.21	0.22	0.23	0.23	0.24	0.25	0.25	*0.26*	*0.26*	*0.27*	*0.27*	*0.28*	*0.28*	*0.28*	*0.28*

Note: The U values shown in italics are above the limit floor U value according to The Building Regulations 2010 (England and Wales).

Case 3: Floor U value $\geqslant$ 0.20 $W \cdot m^{-2} \cdot K^{-1}$ (for a perimeter/area ratio of 0.25)

For example, floor U values for the range shown above can be achieved using 45 mm of insulation with $\lambda = 0.023\ W \cdot m^{-1} \cdot K^{-1}$.

A. Metal base profile

	Wall U value less than or equal to 0.20 $W \cdot m^{-2} \cdot K^{-1}$		Wall U value between 0.21 and 0.25 $W \cdot m^{-2} \cdot K^{-1}$		Wall U value between 0.26 and 0.30 $W \cdot m^{-2} \cdot K^{-1}$	
Solid wall block conductivity ($W \cdot m^{-1} \cdot K^{-1}$)	ψ-value ($W \cdot m^{-1} \cdot K^{-1}$)	Temperature factor	ψ-value ($W \cdot m^{-1} \cdot K^{-1}$)	Temperature factor	ψ-value ($W \cdot m^{-1} \cdot K^{-1}$)	Temperature factor
0.19	0.150	0.86	0.15	0.85	0.16	0.84
0.15	0.13	0.87	0.14	0.86	0.14	0.85
0.11	0.13	0.87	0.13	0.86	0.14	0.85

B. Plastic base profile

	Wall U value less than or equal to 0.20 W·m^{-2}·K^{-1}		Wall U value between 0.21 and 0.25 W·m^{-2}·K^{-1}		Wall U value between 0.26 and 0.30 W·m^{-2}·K^{-1}	
Solid wall block conductivity (W·m^{-1}·K^{-1})	ψ-value (W·m^{-1}·K^{-1})	Temperature factor	ψ-value (W·m^{-1}·K^{-1})	Temperature factor	ψ-value (W·m^{-1}·K^{-1})	Temperature factor
0.19	0.12	0.87	0.13	0.86	0.14	0.85
0.15	0.10	0.88	0.11	0.87	0.12	0.86
0.11	0.10	0.87	0.12	0.87	0.13	0.86

The Table below provides U values for the same floor construction for P/A ratios other than 0.25. The ψ-values can only be used when the actual floor U value is greater than that given for the P/A ratio relevant to the dwelling in question:

P/A (m·m^{-2})	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00
U (W·m^{-2}·K^{-1})	0.18	0.20	0.22	0.23	0.24	0.25	*0.26*	*0.26*	*0.27*	*0.27*	*0.28*	*0.28*	*0.29*	*0.29*	*0.30*	*0.30*	*0.30*

Note: The U values shown in italics are above the limit floor U value according to The Building Regulations 2010 (England and Wales) (as amended).

These values are valid for a floor U value less or equal than 0.25 W·m^{-2}·K^{-1}.

In all the example calculations, external wall insulation fixings are stainless steel, 7 per m^2, diameter of 8 mm with 200 mm aircrete blocks.

Examples of constructions achieving these U values are:

Floor U values ⩽ 0.25 W·m^{-2}·K^{-1} (for a perimeter/area ratio ⩽ 1) can be achieved with:
— 60 mm or thicker insulation with λ ⩽ 0.023 W·m^{-1}·K^{-1}

Wall U values ⩽ 0.30 W·m^{-2}·K^{-1} can be achieved with:

— 95 mm ⩽ insulation thickness ⩽ 115 mm with λ ⩽ 0.036 W·m^{-1}·K^{-1}

Wall U values ⩽ 0.25 W·m^{-2}·K^{-1} can be achieved with:
— 120 mm ⩽ insulation thickness ⩽ 150 mm with λ ⩽ 0.036 W·m^{-1}·K^{-1}

Wall U values ⩽ 0.20 W·m^{-2}·K^{-1} can be achieved with:
— 160 mm minimum insulation thickness with λ ⩽ 0.036 W·m^{-1}·K^{-1}.

Solid Externally Insulated Wall
Suspended in-situ concrete floor — Insulation below slab

CD0039

Guidance checklist

Date: ..... Site manager/supervisor: .....

Site name: ..... Plot No: .....

Ref	Item	Yes/No Inspected (initials and date)
1	Is the external wall insulation below the dpc continued at least 215 mm below the underside of the slab?	☐ ☐ .....
2	Is the conductivity of the insulation below the dpc less or equal than 0.038 $W \cdot m^{-1} \cdot K^{-1}$?	☐ ☐ .....
3	Is there no gap between main wall insulation and insulation below the dpc?	☐ ☐ .....
4	Is the insulation below the dpc the same thickness as the external wall insulation?	☐ ☐ .....
5	Are the foundations at least 450 mm — aircrete blocks?	☐ ☐ .....
6	Is the concrete floor slab 225 mm maximum (including floor finish)?	☐ ☐ .....
7	Does the additional floor edge insulation strip have $\lambda = 0.025\ W \cdot m^{-1} \cdot K^{-1}$ and 15 mm thickness?	☐ ☐ .....
8	Is the external wall insulation below the dpc appropriate for moisture?	☐ ☐ .....
9	Is the floor insulation firmly against the blockwork wall leaving no gaps?	☐ ☐ .....
10	Is the external wall insulation fitted tightly against the blocks with no gaps?	☐ ☐ .....
11	Is the continuity of the air barrier between the floor and the wall achieved? If not, please provide details.	☐ ☐ .....

Notes (include details of any corrective action)

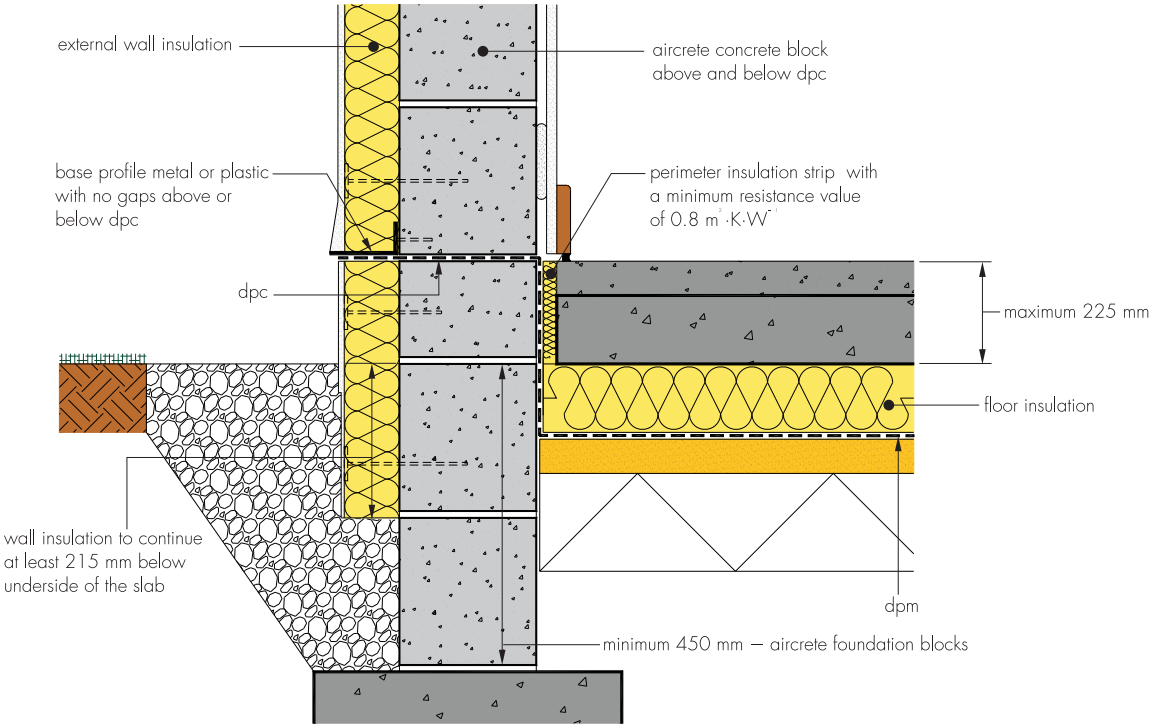
Constructive Details Ltd
Bucknalls Lane,
Watford
Hertfordshire WD25 9BA

t: + 44 (0)1923 665300
f: + 44 (0)1923 665301
e: enquiries@constructivedetails.co.uk
w: www.constructivedetails.co.uk

Solid Externally Insulated Wall

Concrete ground bearing floor — Insulation below slab

CD0040



This indicative guidance illustrates good practice for design and construction with respect to achieving thermal performance and air barrier continuity only. It must be implemented taking due regard of site conditions and all other requirements imposed by Building Regulations.

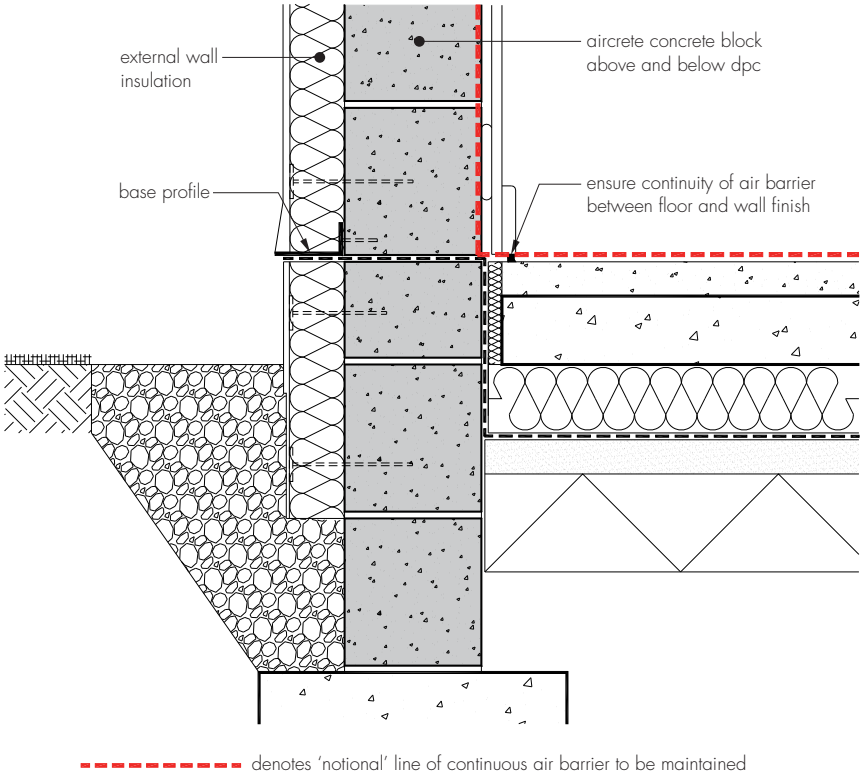
Notes

- perimeter insulation strip with a minimum resistance value of 0.8 $m^2 \cdot K \cdot W^{-1}$ (eg 20 mm of insulation with λ = 0.025 $W \cdot m^{-1} \cdot K^{-1}$) and installed up to top of floor finish
- minimum 450 mm — aircrete foundation blocks from the top of the floor insulation
- maximum 225 mm concrete floor slab (including floor finish)
- wall insulation below the dpc to continue at least 215 mm below underside of slab
- wall insulation below dpc with a maximum conductivity of 0.038 $W \cdot m^{-1} \cdot K^{-1}$
- base profile of metal or plastic, and with no gap between main wall insulation and insulation below dpc
- install a vapour control layer in the warm side of the floor insulation if required by BS 5250 : 2011
- ensure that the floor insulation tightly abuts the blockwork wall
- ensure that the wall insulation below the dpc is fit for purpose with regards to water absorption and of equal thickness to the external wall insulation
- ensure that the external wall insulation fits tightly against the blocks, ensuring that there are no gaps
- ensure there is a seal between the wall and the floor air barrier, and that there are no gaps between skirting board and the floor
- other improved air barrier continuity solutions can be used.

Issued: 16 October 2013

Solid Externally Insulated Wall
Concrete ground bearing floor — Insulation below slab

CD0040



This indicative guidance illustrates good practice for design and construction with respect to achieving thermal performance and air barrier continuity only. It must be implemented taking due regard of site conditions and all other requirements imposed by Building Regulations.

Calculated ψ-values for this detail

Case 1: Floor U value between 0.08 and 0.11 W·m^{-2}·K^{-1} (for a perimeter/area ratio of 0.25)

For example, floor U values for the range shown above can be achieved with insulation thickness between 130 and 200 mm and with $\lambda \leq 0.023$ W·m^{-1}·K^{-1}.

A. Metal base profile

	Wall U value less than or equal to 0.20 W·m^{-2}·K^{-1}		Wall U value between 0.21 and 0.25 W·m^{-2}·K^{-1}		Wall U value between 0.26 and 0.30 W·m^{-2}·K^{-1}	
Solid wall block conductivity (W·m^{-1}·K^{-1})	ψ-value (W·m^{-1}·K^{-1})	Temperature factor	ψ-value (W·m^{-1}·K^{-1})	Temperature factor	ψ-value (W·m^{-1}·K^{-1})	Temperature factor
0.19	0.139	0.93	0.144	0.92	0.140	0.92
0.15	0.122	0.93	0.128	0.92	0.123	0.92
0.11	0.115	0.93	0.113	0.93	0.117	0.92

B. Plastic base profile

	Wall U value less than or equal to 0.20 W·m^{-2}·K^{-1}		Wall U value between 0.21 and 0.25 W·m^{-2}·K^{-1}		Wall U value between 0.26 and 0.30 W·m^{-2}·K^{-1}	
Solid wall block conductivity (W·m^{-1}·K^{-1})	ψ-value (W·m^{-1}·K^{-1})	Temperature factor	ψ-value (W·m^{-1}·K^{-1})	Temperature factor	ψ-value (W·m^{-1}·K^{-1})	Temperature factor
0.19	0.116	0.93	0.121	0.93	0.127	0.92
0.15	0.103	0.94	0.110	0.93	0.113	0.93
0.11	0.101	0.93	0.105	0.93	0.110	0.93

The Table below provides U values for the same floor construction for P/A ratios other than 0.25. The ψ-values can only be used when the actual floor U value is less than that given for the P/A ratio relevant to the dwelling in question:

P/A ($m \cdot m^{-2}$)	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00
U ($W \cdot m^{-2} \cdot K^{-1}$)	0.11	0.11	0.12	0.12	0.13	0.13	0.13	0.13	0.13	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14

Case 2: Floor U value between 0.12 and 0.19 $W \cdot m^{-2} \cdot K^{-1}$ (for a perimeter/area ratio of 0.25)

For example, floor U values for the range shown above can be achieved with insulation thickness between 50 mm and 125 mm and with $\lambda \leqslant 0.023$ $W \cdot m^{-1} \cdot K^{-1}$.

A. Metal base profile

	Wall U value less or equal than 0.20 $W \cdot m^{-2} \cdot K^{-1}$		Wall U value between 0.21 and 0.25 $W \cdot m^{-2} \cdot K^{-1}$		Wall U value between 0.26 and 0.30 $W \cdot m^{-2} \cdot K^{-1}$	
Solid wall block conductivity ($W \cdot m^{-1} \cdot K^{-1}$)	ψ-value ($W \cdot m^{-1} \cdot K^{-1}$)	Temperature factor	ψ-value ($W \cdot m^{-1} \cdot K^{-1}$)	Temperature factor	ψ-value ($W \cdot m^{-1} \cdot K^{-1}$)	Temperature factor
0.19	0.130	0.92	0.135	0.91	0.131	0.91
0.15	0.114	0.92	0.115	0.92	0.114	0.92
0.11	0.106	0.92	0.105	0.92	0.108	0.92

B. Plastic base profile

	Wall U value $\leqslant 0.20$ $W \cdot m^{-2} \cdot K^{-1}$		Wall U value between 0.21 and 0.25 $W \cdot m^{-2} \cdot K^{-1}$		Wall U value between 0.26 and 0.30 $W \cdot m^{-2} \cdot K^{-1}$	
Solid wall block conductivity ($W \cdot m^{-1} \cdot K^{-1}$)	ψ-value ($W \cdot m^{-1} \cdot K^{-1}$)	Temperature factor	ψ-value ($W \cdot m^{-1} \cdot K^{-1}$)	Temperature factor	ψ-value ($W \cdot m^{-1} \cdot K^{-1}$)	Temperature factor
0.19	0.110	0.93	0.111	0.92	0.119	0.92
0.15	0.099	0.93	0.102	0.92	0.105	0.92
0.11	0.093	0.93	0.099	0.92	0.104	0.92

The Table below provides U values for the same floor construction for P/A ratios other than 0.25. The ψ-values can only be used when the actual floor U value is less than that given for the P/A ratio relevant to the dwelling in question:

P/A ($m \cdot m^{-2}$)	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00
U ($W \cdot m^{-2} \cdot K^{-1}$)	0.18	0.19	0.21	0.22	0.23	0.23	0.24	0.25	0.25	*0.26*	*0.26*	*0.27*	*0.27*	*0.28*	*0.28*	*0.28*	*0.28*

Note: The U values shown in italics are above the limit floor U value according to The Building Regulations 2010 (England and Wales) (as amended).

Case 3: Floor U value $\geqslant$ 0.20 $W \cdot m^{-2} \cdot K^{-1}$ (for a perimeter/area ratio of 0.25)

For example, floor U values for the range shown above can be achieved using 45 mm of insulation with $\lambda = 0.023$ $W \cdot m^{-1} \cdot K^{-1}$.

A. Metal base profile

	Wall U value less than or equal to 0.20 $W \cdot m^{-2} \cdot K^{-1}$		Wall U value between 0.21 and 0.25 $W \cdot m^{-2} \cdot K^{-1}$		Wall U value between 0.26 and 0.30 $W \cdot m^{-2} \cdot K^{-1}$	
Solid wall block conductivity ($W \cdot m^{-1} \cdot K^{-1}$)	ψ-value ($W \cdot m^{-1} \cdot K^{-1}$)	Temperature factor	ψ-value ($W \cdot m^{-1} \cdot K^{-1}$)	Temperature factor	ψ-value ($W \cdot m^{-1} \cdot K^{-1}$)	Temperature factor
0.19	0.082	0.91	0.087	0.90	0.083	0.90
0.15	0.068	0.91	0.068	0.91	0.073	0.91
0.11	0.059	0.91	0.057	0.91	0.066	0.91

B. Plastic base profile

	Wall U value less than or equal to 0.20 W·m^{-2}·K^{-1}		Wall U value between 0.21 and 0.25 W·m^{-2}·K^{-1}		Wall U value between 0.26 and 0.30 W·m^{-2}·K^{-1}	
Solid wall block conductivity (W·m^{-1}·K^{-1})	ψ-value (W·m^{-1}·K^{-1})	Temperature factor	ψ-value (W·m^{-1}·K^{-1})	Temperature factor	ψ-value (W·m^{-1}·K^{-1})	Temperature factor
0.19	0.061	0.92	0.066	0.91	0.071	0.91
0.15	0.048	0.92	0.055	0.91	0.059	0.91
0.11	0.048	0.92	0.052	0.91	0.058	0.91

The Table below provides U values for the same floor construction for P/A ratios other than 0.25. The ψ-values can only be used when the actual floor U value is greater than that given for the P/A ratio relevant to the dwelling in question:

P/A (m·m^{-2})	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00
U (W·m^{-2}·K^{-1})	0.18	0.20	0.22	0.23	0.24	0.25	*0.26*	*0.26*	*0.27*	*0.27*	*0.28*	*0.28*	*0.29*	*0.29*	*0.30*	*0.30*	*0.30*

Note: The U values shown in italics are above the limit floor U value according to The Building Regulations 2010 (England and Wales) (as amended).

These values are valid for a floor U value less than or equal to 0.25 W·m^{-2}·K^{-1}.

In all the example calculations, external wall insulation fixings are stainless steel, 7 per m^2, diameter of 8 mm with 200 mm aircrete blocks.

Examples of constructions achieving these U values are:

Floor U values ⩽ 0.25 W·m^{-2}·K^{-1} (for a perimeter/area ratio ⩽ 1) can be achieved with:
— 60 mm or thicker insulation with λ ⩽ 0.023 W·m^{-1}·K^{-1}

Wall U values ⩽ 0.30 W·m^{-2}·K^{-1} can be achieved with:
— 95 mm ⩽ insulation thickness ⩽ 115 mm with λ ⩽ 0.036 W·m^{-1}·K^{-1}

Wall U values ⩽ 0.25 W·m^{-2}·K^{-1} can be achieved with:
— 120 mm ⩽ insulation thickness ⩽ 150 mm with λ ⩽ 0.036 W·m^{-1}·K^{-1}

Wall U values ⩽ 0.20 W·m^{-2}·K^{-1} can be achieved with:
— 160 mm minimum insulation thickness with λ ⩽ 0.036 W·m^{-1}·K^{-1}.

Solid Externally Insulated Wall
Concrete ground bearing floor — Insulation below slab

CD0040

Guidance checklist

Date: ..... Site manager/supervisor: .....

Site name: ..... Plot No: .....

Ref	Item	Yes/No Inspected (initials and date)
1	Is the edge insulation as specified? — Minimum resistance of 0.8 $m^2 \cdot K^1 \cdot W^{-1}$ (eg 20 mm of insulation with λ = 0.025 $W \cdot m^{-1} \cdot K^{-1}$) — Installed up to floor finish.	☐ ☐ ..... ☐ ☐ .....
2	Is the external wall insulation below the dpc continued at least 215 mm below the underside of the slab?	☐ ☐ .....
3	Is the conductivity of the insulation below the dpc less or equal than 0.038 $W \cdot m^{-1} \cdot K^{-1}$?	☐ ☐ .....
4	Is there no gap between main wall insulation and insulation below the dpc?	☐ ☐ .....
5	Is the insulation below the dpc the same thickness as the external wall insulation?	☐ ☐ .....
6	Are the foundations at least 450 mm of aircrete blocks?	☐ ☐ .....
7	Is the concrete floor slab 225 mm maximum (including floor finish)?	☐ ☐ .....
8	Is the external wall insulation below the dpc appropriate for moisture?	☐ ☐ .....
9	Is the floor insulation firmly against the blockwork wall leaving no gaps?	☐ ☐ .....
10	Is the external wall insulation fitted tightly against the blocks with no gaps?	☐ ☐ .....
11	Is the continuity of the air barrier between the floor and the wall achieved? If not, please provide details.	☐ ☐ .....

Notes (include details of any corrective action)

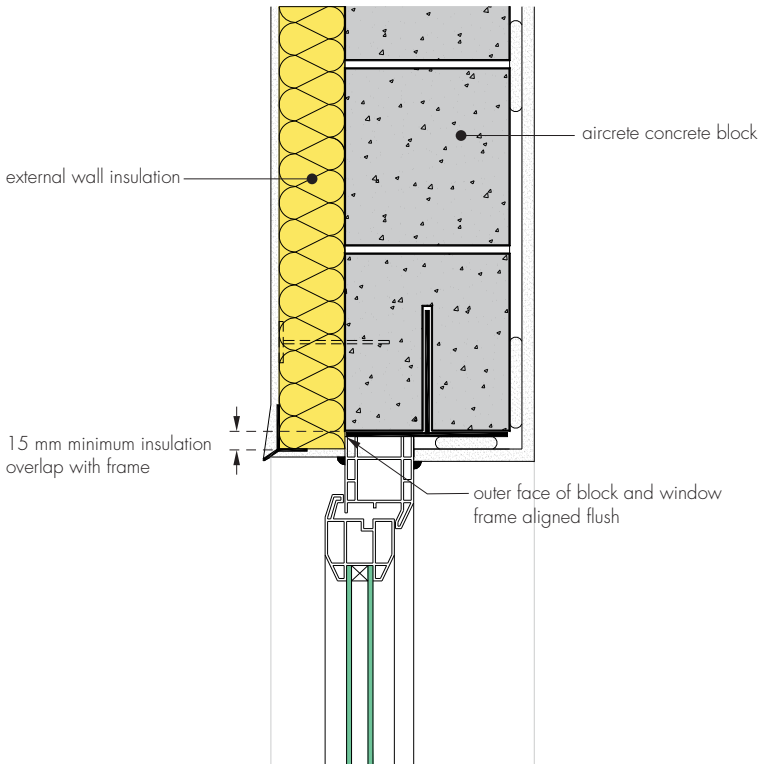
Constructive Details Ltd
Bucknalls Lane,
Watford
Hertfordshire WD25 9BA

t: + 44 (0)1923 665300
f: + 44 (0)1923 665301
e: enquiries@constructivedetails.co.uk
w: www.constructivedetails.co.uk

Solid Externally Insulated Wall

Steel lintel

CD0041



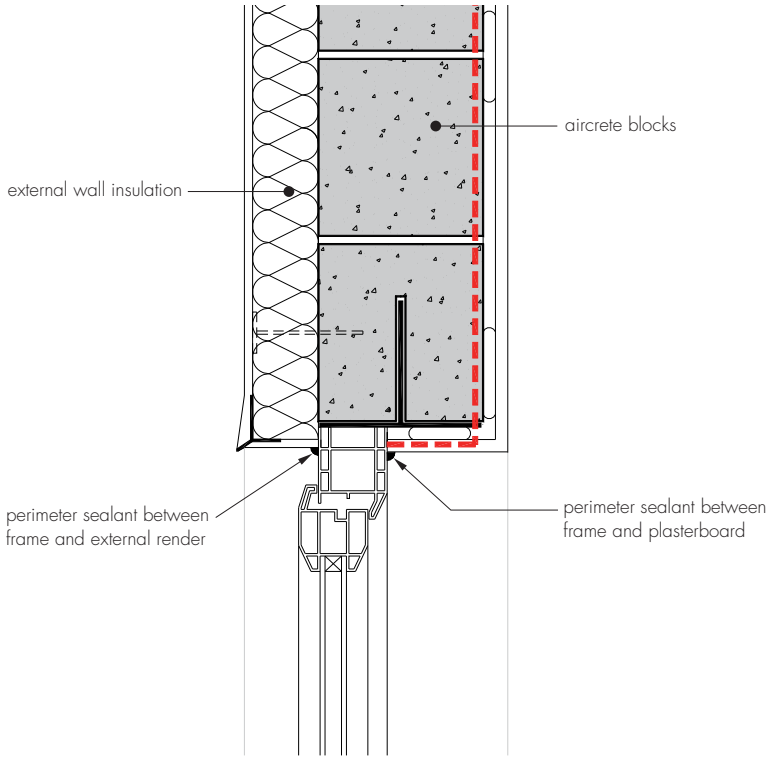
This indicative guidance illustrates good practice for design and construction with respect to achieving thermal performance and air barrier continuity only. It must be implemented taking due regard of site conditions and all other requirements imposed by Building Regulations.

Notes

- minimum 15 mm overlap of the external wall insulation with the window frame (packer excluded)
- ensure that the external wall insulation fits tightly against the blocks, ensuring that there are no gaps
- T-type lintel shown, any other steel lintel could be used including an insulated box lintel with thickness not greater than 2 mm (for the box lintel)
- flexible sealant should be applied between frame and external render and frame and plasterboard
- other improved air barrier continuity solutions can be used.

Solid Externally Insulated Wall
Steel lintel

CD0041



denotes 'notional' line of continuous air barrier to be maintained

This indicative guidance illustrates good practice for design and construction with respect to achieving thermal performance and air barrier continuity only. It must be implemented taking due regard of site conditions and all other requirements imposed by Building Regulations.

Calculated ψ-values for this detail

Conductivity value of wall insulation between 0.036 and 0.044 $W \cdot m^{-1} \cdot K^{-1}$.

	Wall U value less than or equal to 0.20 $W \cdot m^{-2} \cdot K^{-1}$		Wall U value between 0.21 and 0.25 $W \cdot m^{-2} \cdot K^{-1}$		Wall U value between 0.26 and 0.30 $W \cdot m^{-2} \cdot K^{-1}$	
Solid wall block conductivity ($W \cdot m^{-1} \cdot K^{-1}$)	ψ-value ($W \cdot m^{-1} \cdot K^{-1}$)	Temperature factor	ψ-value ($W \cdot m^{-1} \cdot K^{-1}$)	Temperature factor	ψ-value ($W \cdot m^{-1} \cdot K^{-1}$)	Temperature factor
0.19	0.054	0.95	0.053	0.94	0.056	0.93
0.15	0.055	0.94	0.055	0.94	0.062	0.93
0.11	0.056	0.94	0.061	0.93	0.072	0.92

Conductivity value of wall insulation between 0.026 and 0.035 $W \cdot m^{-1} \cdot K^{-1}$.

	Wall U value less than or equal to 0.20 $W \cdot m^{-2} \cdot K^{-1}$		Wall U value between 0.21 and 0.25 $W \cdot m^{-2} \cdot K^{-1}$		Wall U value between 0.26 and 0.30 $W \cdot m^{-2} \cdot K^{-1}$	
Solid wall block conductivity ($W \cdot m^{-1} \cdot K^{-1}$)	ψ-value ($W \cdot m^{-1} \cdot K^{-1}$)	Temperature factor	ψ-value ($W \cdot m^{-1} \cdot K^{-1}$)	Temperature factor	ψ-value ($W \cdot m^{-1} \cdot K^{-1}$)	Temperature factor
0.19	0.043	0.95	0.044	0.94	0.047	0.94
0.15	0.044	0.95	0.046	0.94	0.053	0.93
0.11	0.046	0.95	0.053	0.94	0.065	0.92

Solid Externally Insulated Wall
Steel lintel

CD0041

Conductivity value of wall insulation less or equal than 0.025 $W \cdot m^{-1} \cdot K^{-1}$.

	Wall U value less or equal than 0.20 $W \cdot m^{-2} \cdot K^{-1}$		Wall U value between 0.21 and 0.25 $W \cdot m^{-2} \cdot K^{-1}$		Wall U value between 0.26 and 0.30 $W \cdot m^{-2} \cdot K^{-1}$	
Solid wall block conductivity ($W \cdot m^{-1} \cdot K^{-1}$)	ψ-value ($W \cdot m^{-1} \cdot K^{-1}$)	Temperature factor	ψ-value ($W \cdot m^{-1} \cdot K^{-1}$)	Temperature factor	ψ-value ($W \cdot m^{-1} \cdot K^{-1}$)	Temperature factor
0.19	0.030	0.96	0.033	0.95	0.038	0.94
0.15	0.034	0.95	0.036	0.95	0.045	0.94
0.11	0.036	0.95	0.044	0.94	0.059	0.93

These values are valid for a wall U value $\leqslant$ 0.30 $W \cdot m^{-2} \cdot K^{-1}$.

In all example calculations, external wall insulation fixings are stainless steel, 7 per m^2, diameter of 8 mm with 200 mm aircrete blocks.

Examples of constructions achieving these U values are:

Wall U values $\leqslant$ 0.30 $W \cdot m^{-2} \cdot K^{-1}$ can be achieved with:
— 95 mm $\leqslant$ insulation thickness $\leqslant$ 115 mm with $\lambda \leqslant$ 0.036 $W \cdot m^{-1} \cdot K^{-1}$

Wall U values $\leqslant$ 0.25 $W \cdot m^{-2} \cdot K^{-1}$ can be achieved with:
— 120 mm $\leqslant$ insulation thickness $\leqslant$ 150 mm with $\lambda \leqslant$ 0.036 $W \cdot m^{-1} \cdot K^{-1}$

Wall U values $\leqslant$ 0.20 $W \cdot m^{-2} \cdot K^{-1}$ can be achieved with:
— 160 mm minimum insulation thickness with $\lambda \leqslant$ 0.036 $W \cdot m^{-1} \cdot K^{-1}$.

Solid Externally Insulated Wall
Steel lintel

CD0041

Guidance checklist

Date: ..... Site manager/supervisor: .....

Site name: ..... Plot No: .....

Ref	Item	Yes/No Inspected (initials and date)
1	Does the external wall insulation overlap by 15 mm minimum with the window frame (packer excluded)?	☐ ☐ .....
2	Are the outer face of the block and the window frame aligned flush?	☐ ☐ .....
3	Is the external wall insulation fitted tightly against the blocks with no gaps?	☐ ☐ .....
4	Is the continuity of the air barrier achieved? If not, please provide details.	☐ ☐ .....

Notes (include details of any corrective action)

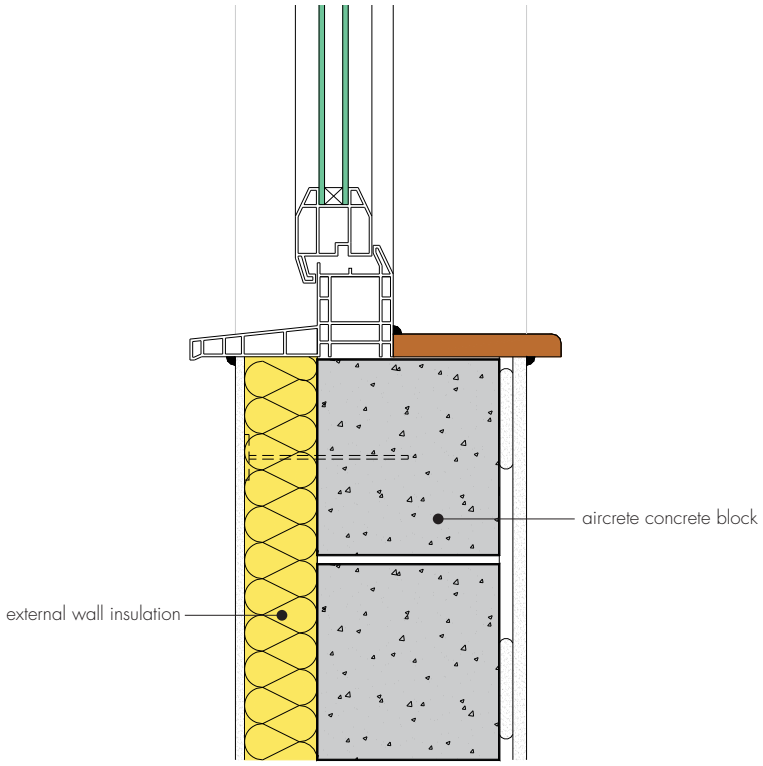
Constructive Details Ltd
Bucknalls Lane,
Watford
Hertfordshire WD25 9BA

t: + 44 (0)1923 665300
f: + 44 (0)1923 665301
e: enquiries@constructivedetails.co.uk
w: www.constructivedetails.co.uk

Solid Externally Insulated Wall

Sill

CD0042



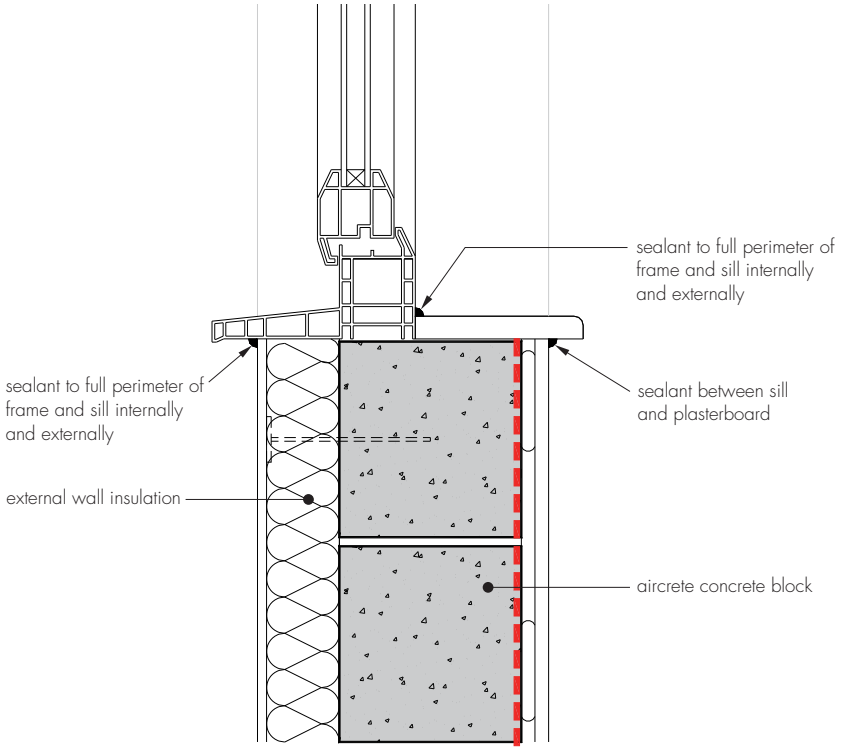
This indicative guidance illustrates good practice for design and construction with respect to achieving thermal performance and air barrier continuity only. It must be implemented taking due regard of site conditions and all other requirements imposed by Building Regulations.

Notes

- PVC or wood based materials for the external and internal sills
- ensure that the external wall insulation fits tightly against the blocks with no gaps and the underside of the sill
- flexible sealant should be applied between frame and external render, frame and sill board and also between the sill and the plasterboard
- other improved air barrier continuity solutions can be used.

Solid Externally Insulated Wall
Sill

CD0042



This indicative guidance illustrates good practice for design and construction with respect to achieving thermal performance and air barrier continuity only. It must be implemented taking due regard of site conditions and all other requirements imposed by Building Regulations.

Calculated ψ-values for this detail

	Wall U value less than or equal to 0.20 W·m^{-2}·K^{-1}		Wall U value between 0.21 and 0.25 W·m^{-2}·K^{-1}		Wall U value between 0.26 and 0.30 W·m^{-2}·K^{-1}	
Solid wall block conductivity (W·m^{-1}·K^{-1})	ψ-value (W·m^{-1}·K^{-1})	Temperature factor	ψ-value (W·m^{-1}·K^{-1})	Temperature factor	ψ-value (W·m^{-1}·K^{-1})	Temperature factor
0.19	0.042	0.88	0.038	0.87	0.032	0.87
0.15	0.036	0.88	0.031	0.87	0.031	0.84
0.11	0.027	0.88	0.027	0.86	0.025	0.86

These values are valid for a wall U value ⩽ 0.30 W·m^{-2}·K^{-1}.

In all example calculations, external wall insulation fixings are stainless steel, 7 per m^2, diameter of 8 mm with 200 mm aircrete blocks.

Examples of constructions achieving these U values are:

Wall U values ⩽ 0.30 W·m^{-2}·K^{-1} can be achieved with:
— 95 mm ⩽ insulation thickness ⩽ 115 mm with λ ⩽ 0.036 W·m^{-1}·K^{-1}

Wall U values ⩽ 0.25 W·m^{-2}·K^{-1} can be achieved with:
— 120 mm ⩽ insulation thickness ⩽ 150 mm with λ ⩽ 0.036 W·m^{-1}·K^{-1}

Wall U values ⩽ 0.20 W·m^{-2}·K^{-1} can be achieved with:
— 160 mm minimum insulation thickness with λ ⩽ 0.036 W·m^{-1}·K^{-1}.

Solid Externally Insulated Wall
Sill

CD0042

Guidance checklist

Date: ..... Site manager/supervisor: .....

Site name: ..... Plot No: .....

Ref	Item	Yes/No Inspected (initials and date)
1	Is the sill made of PVC, timber or material with similar thermal conductivity?	☐ ☐ .....
2	Is the external wall insulation installed correctly with no gaps between the insulation and the external sill?	☐ ☐ .....
3	Is the continuity of the air barrier achieved? If not, please provide details.	☐ ☐ .....

Notes (include details of any corrective action)

Constructive Details Ltd
Bucknalls Lane,
Watford
Hertfordshire WD25 9BA

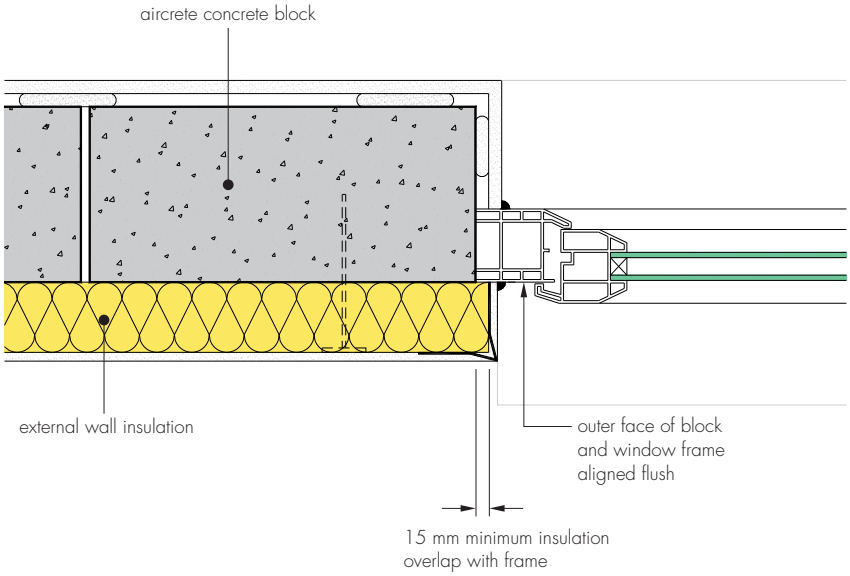
t: + 44 (0)1923 665300
f: + 44 (0)1923 665301

e: enquiries@constructivedetails.co.uk
w: www.constructivedetails.co.uk

Solid Externally Insulated Wall

Jamb

CD0043



This indicative guidance illustrates good practice for design and construction with respect to achieving thermal performance and air barrier continuity only. It must be implemented taking due regard of site conditions and all other requirements imposed by Building Regulations.

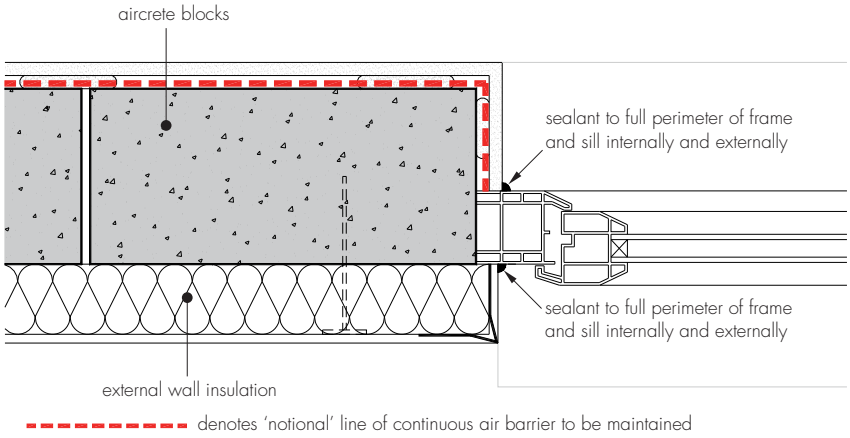
Notes

- minimum 15 mm overlap of the external wall insulation with the window frame (excluding packer)
- ensure that the external wall insulation fits tightly against the blocks, ensuring that there are no gaps
- ensure that the outer face of block and window frame are aligned flush
- flexible sealant should be applied between frame and external render and frame and plasterboard
- other improved air barrier continuity solutions can be used.

Issued: 16 October 2013

Solid Externally Insulated Wall
Jamb

CD0043



This indicative guidance illustrates good practice for design and construction with respect to achieving thermal performance and air barrier continuity only. It must be implemented taking due regard of site conditions and all other requirements imposed by Building Regulations.

Calculated ψ-values for this detail

	Wall U value less than or equal to 0.20 W·m^{-2}·K^{-1}		Wall U value between 0.21 and 0.25 W·m^{-2}·K^{-1}		Wall U value between 0.26 and 0.30 W·m^{-2}·K^{-1}	
Solid Wall block conductivity (W·m^{-1}·K^{-1})	ψ-value (W·m^{-1}·K^{-1})	Temperature factor	ψ-value (W·m^{-1}·K^{-1})	Temperature factor	ψ-value (W·m^{-1}·K^{-1})	Temperature factor
0.19	0.032	0.92	0.028	0.91	0.025	0.90
0.15	0.028	0.92	0.025	0.90	0.024	0.90
0.11	0.023	0.92	0.021	0.91	0.023	0.90

These values are valid for a wall U value ⩽ 0.30 W·m^{-2}·K^{-1}.

In all example calculations, external wall insulation fixings are stainless steel, 7 per m^2, diameter of 8 mm with 200 mm aircrete blocks.

Examples of constructions achieving these U values are:

Wall U values ⩽ 0.30 W·m^{-2}·K^{-1} can be achieved with:
— 95 mm ⩽ insulation thickness ⩽ 115 mm with λ ⩽ 0.036 W·m^{-1}·K^{-1}

Wall U values ⩽ 0.25 W·m^{-2}·K^{-1} can be achieved with:
— 120 mm ⩽ insulation thickness ⩽ 150 mm with λ ⩽ 0.036 W·m^{-1}·K^{-1}

Wall U values ⩽ 0.20 W·m^{-2}·K^{-1} can be achieved with:
— 160 mm minimum insulation thickness with λ ⩽ 0.036 W·m^{-1}·K^{-1}.

Solid Externally Insulated Wall
Jamb

CD0043

Guidance checklist

Date: ..... Site manager/supervisor: .....

Site name: ..... Plot No: .....

Ref	Item	Yes/No Inspected (initials and date)
1	Does the external wall insulation overlap by 15 mm minimum with the window frame (packer excluded)?	☐ ☐ .....
2	Are the outer face of the block and the window frame aligned flush?	☐ ☐ .....
3	Is the external wall insulation fitted tightly against the blocks with no gaps?	☐ ☐ .....
4	Is the continuity of the air barrier achieved? If not, please provide details.	☐ ☐ .....

Notes (include details of any corrective action)

Constructive Details Ltd
Bucknalls Lane,
Watford
Hertfordshire WD25 9BA

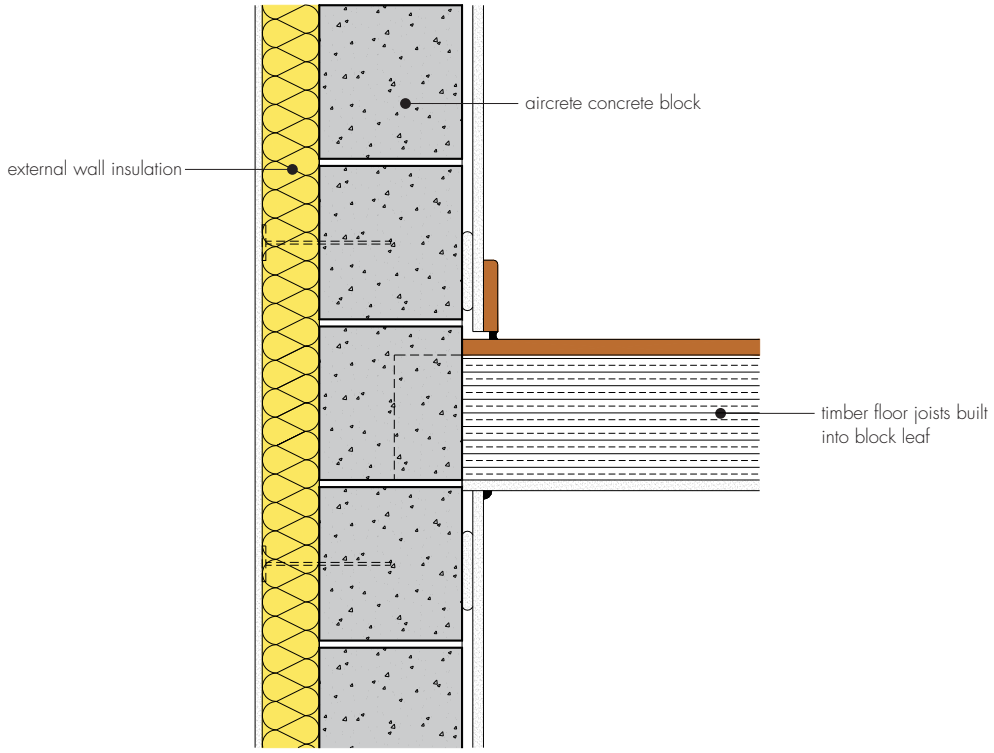
t: + 44 (0)1923 665300
f: + 44 (0)1923 665301

e: enquiries@constructivedetails.co.uk
w: www.constructivedetails.co.uk

Solid Externally Insulated Wall

Intermediate timber floor within a dwelling

CD0044



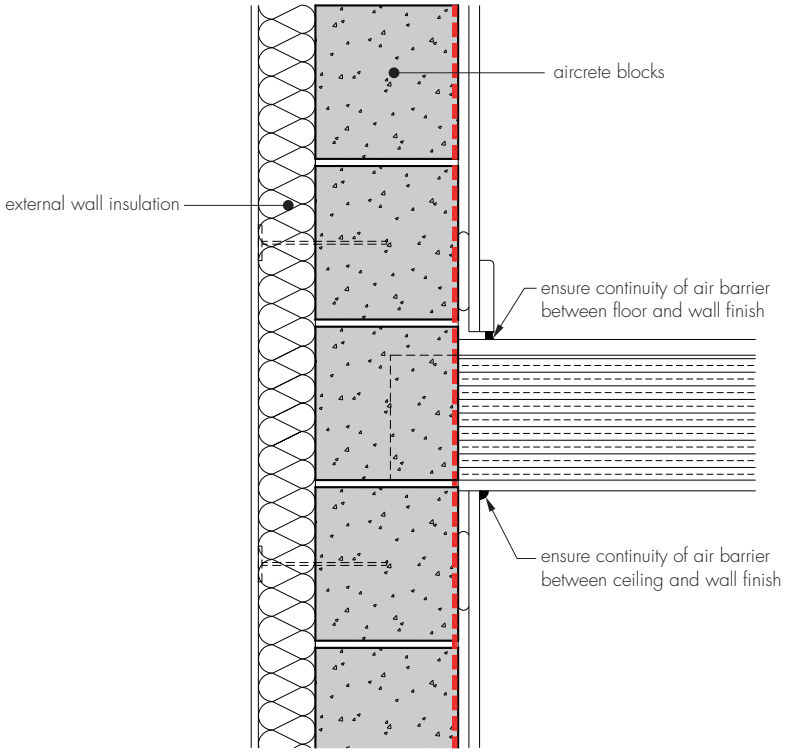
This indicative guidance illustrates good practice for design and construction with respect to achieving thermal performance and air barrier continuity only. It must be implemented taking due regard of site conditions and all other requirements imposed by Building Regulations.

Notes

- continue external wall insulation across floor abutment zone
- ensure that the external wall insulation fits tightly against the blocks, ensuring that there are no gaps
- this detail is also valid for joists supported using joist hangers (not shown in drawing)
- ensure that the continuity of the air barrier between ceiling and wall finish and floor and wall finish is maintained
- other improved air barrier continuity solutions can be used.

Solid Externally Insulated Wall
Intermediate timber floor within a dwelling

CD0044



denotes 'notional' line of continuous air barrier to be maintained

This indicative guidance illustrates good practice for design and construction with respect to achieving thermal performance and air barrier continuity only. It must be implemented taking due regard of site conditions and all other requirements imposed by Building Regulations.

Calculated ψ-values for this detail

Solid wall block conductivity ($W \cdot m^{-1} \cdot K^{-1}$)	ψ-value ($W \cdot m^{-1} \cdot K^{-1}$)
0.19	0.00
0.15	0.00
0.11	0.00

These values are valid for a wall U value $\leqslant 0.30$ $W \cdot m^{-2} \cdot K^{-1}$.

In all example calculations, external wall insulation fixings are stainless steel, 7 per m^2, diameter of 8 mm with 200 mm aircrete blocks.

Examples of constructions achieving these U values are:

Wall U values $\leqslant 0.30$ $W \cdot m^{-2} \cdot K^{-1}$ can be achieved with:
— 95 mm $\leqslant$ insulation thickness $\leqslant$ 115 mm with $\lambda \leqslant 0.036$ $W \cdot m^{-1} \cdot K^{-1}$

Wall U values $\leqslant 0.25$ $W \cdot m^{-2} \cdot K^{-1}$ can be achieved with:
— 120 mm $\leqslant$ insulation thickness $\leqslant$150 mm with $\lambda \leqslant 0.036$ $W \cdot m^{-1} \cdot K^{-1}$

Wall U values $\leqslant 0.20$ $W \cdot m^{-2} \cdot K^{-1}$ can be achieved with:
— 160 mm minimum insulation thickness with $\lambda \leqslant 0.036$ $W \cdot m^{-1} \cdot K^{-1}$.

Solid Externally Insulated Wall
Intermediate timber floor within a dwelling

CD0044

Guidance checklist

Date: ..... Site manager/supervisor: .....

Site name: ..... Plot No: .....

Ref	Item	Yes/No Inspected (initials and date)
1	Is the continuity of insulation throughout the junction achieved?	☐ ☐ .....
2	Is the external wall insulation installed tightly against the blocks with no gaps?	☐ ☐ .....
4	Is the continuity of the air barrier achieved? If not, please provide details.	☐ ☐ .....

Notes (include details of any corrective action)

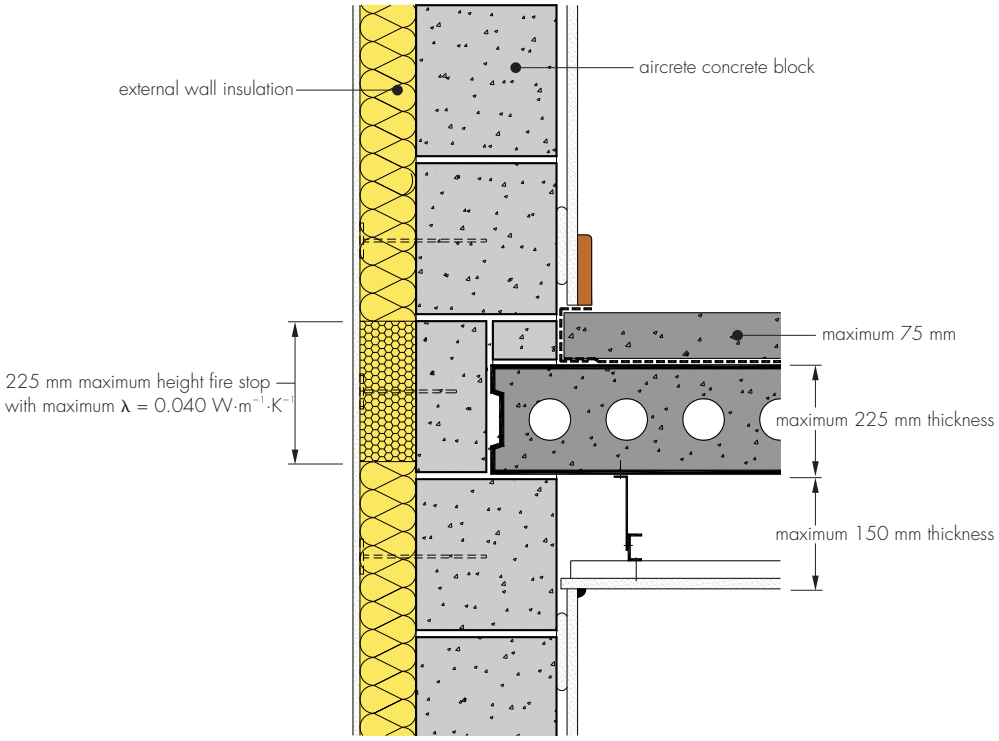
Constructive Details Ltd
Bucknalls Lane,
Watford
Hertfordshire WD25 9BA

t: + 44 (0)1923 665300
f: + 44 (0)1923 665301
e: enquiries@constructivedetails.co.uk
w: www.constructivedetails.co.uk

Solid Externally Insulated Wall

Precast concrete separating floor between dwellings

CD0045



This indicative guidance illustrates good practice for design and construction with respect to achieving thermal performance and air barrier continuity only. It must be implemented taking due regard of site conditions and all other requirements imposed by Building Regulations.

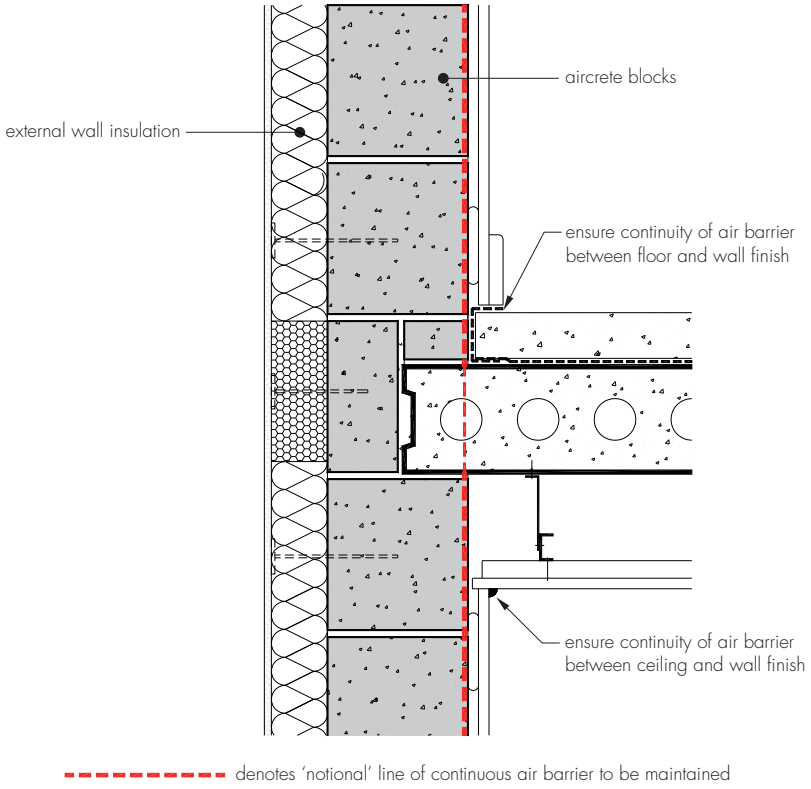
Notes

- maximum thickness of precast concrete plank floor 225 mm
- maximum thickness of concrete screed 75 mm
- maximum thickness of ceiling void 150 mm
- maximum conductivity of fire stop, where required, to be 0.040 $W \cdot m^{-1} \cdot K^{-1}$ and a maximum of 225 mm height
- fire stop is required only if the external wall insulation is combustible
- ensure that the external wall insulation is fitted tightly against the blocks with no gaps
- ensure that the there is a seal between the wall and the floor barrier, and that there is no unsealed gap between the skirting board and the floor
- other improved air barrier continuity solutions can be used.

Issued: 16 October 2013

Solid Externally Insulated Wall
Precast concrete separating floor between dwellings

CD0045



This indicative guidance illustrates good practice for design and construction with respect to achieving thermal performance and air barrier continuity only. It must be implemented taking due regard of site conditions and all other requirements imposed by Building Regulations.

Calculated ψ-values for this detail

	Wall U value less than or equal to 0.20 $W \cdot m^{-2} \cdot K^{-1}$		Wall U value between 0.21 and 0.25 $W \cdot m^{-2} \cdot K^{-1}$		Wall U value between 0.26 and 0.30 $W \cdot m^{-2} \cdot K^{-1}$	
Solid wall block conductivity ($W \cdot m^{-1} \cdot K^{-1}$)	ψ-value ($W \cdot m^{-1} \cdot K^{-1}$)	Temperature factor	ψ-value ($W \cdot m^{-1} \cdot K^{-1}$)	Temperature factor	ψ-value ($W \cdot m^{-1} \cdot K^{-1}$)	Temperature factor
0.19	0.064	0.96	0.079	0.95	0.094	0.94
0.15	0.064	0.96	0.080	0.95	0.095	0.94
0.11	0.065	0.96	0.080	0.95	0.096	0.94

The ψ-value is applied to each dwelling.

These values are valid for a wall U value $\leqslant 0.30\ W \cdot m^{-2} \cdot K^{-1}$.

In all example calculations, external wall insulation fixings are stainless steel, 7 per m^2, diameter of 8 mm with 200 mm aircrete blocks.

Examples of constructions achieving these U values are:

Wall U values $\leqslant 0.30\ W \cdot m^{-2} \cdot K^{-1}$ can be achieved with:
— 95 mm ⩽ insulation thickness ⩽ 115 mm with $\lambda \leqslant 0.036\ W \cdot m^{-1} \cdot K^{-1}$

Wall U values $\leqslant 0.25\ W \cdot m^{-2} \cdot K^{-1}$ can be achieved with:
— 120 mm ⩽ insulation thickness ⩽ 150 mm with $\lambda \leqslant 0.036\ W \cdot m^{-1} \cdot K^{-1}$

Wall U values $\leqslant 0.20\ W \cdot m^{-2} \cdot K^{-1}$ can be achieved with:
— 160 mm minimum insulation thickness with $\lambda \leqslant 0.036\ W \cdot m^{-1} \cdot K^{-1}$.

Solid Externally Insulated Wall
Precast concrete separating floor between dwellings

CD0045

Guidance checklist

Date: ..... Site manager/supervisor: .....

Site name: ..... Plot No: .....

Ref	Item	Yes/No Inspected (initials and date)
1	Is the precast concrete plank thickness 225 mm or less?	☐ ☐ .....
2	Is the concrete screed thickness 75 mm or less?	☐ ☐ .....
3	Is the ceiling void thickness 150 mm or less?	☐ ☐ .....
4	Is the fire stop conductivity, where required, 0.040 $W \cdot m^{-1} \cdot K^{-1}$ or less and 225 mm high or less?	☐ ☐ .....
5	Is the external wall insulation installed tightly against the blocks with no gaps ?	☐ ☐ .....
6	Is the continuity of the air barrier achieved? If not, please provide details.	☐ ☐ .....

Notes (include details of any corrective action)

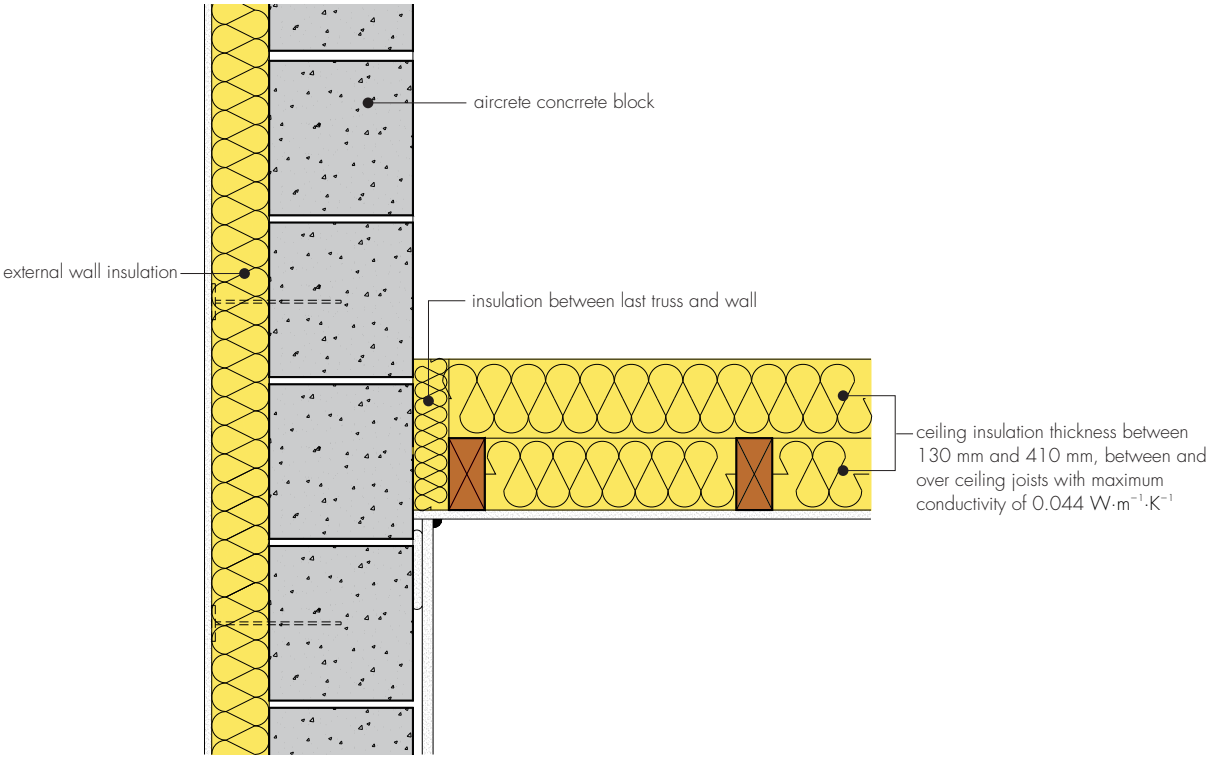
Constructive Details Ltd
Bucknalls Lane,
Watford
Hertfordshire WD25 9BA

t: + 44 (0)1923 665300
f: + 44 (0)1923 665301
e: enquiries@constructivedetails.co.uk
w: www.constructivedetails.co.uk

Solid Externally Insulated Wall

Pitched roof. Gable — Insulation at ceiling level — Ventilated loft

CD0046



This indicative guidance illustrates good practice for design and construction with respect to achieving thermal performance and air barrier continuity only. It must be implemented taking due regard of site conditions and all other requirements imposed by Building Regulations.

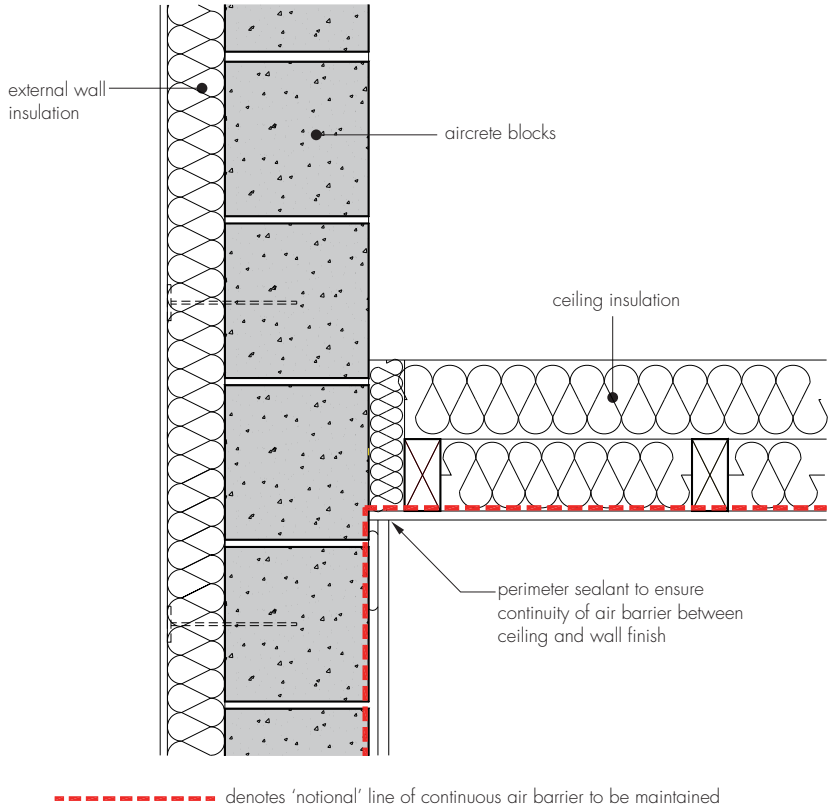
Notes

- ceiling insulation thickness between 130 and 410 mm with a maximum conductivity of 0.044 $W \cdot m^{-1} \cdot K^{-1}$
- pack compressible insulation between last truss/joist and gable wall to prevent any gaps between the insulation and the inner edge of the wall
- ensure that the external wall insulation is installed tightly against the blocks with no gaps
- seal between the ceiling and wall with either plaster, adhesive or flexible sealant
- other improved air barrier continuity solutions can be used.

Issued: 16 October 2013

Solid Externally Insulated Wall
Pitched Roof. Gable — Insulation at ceiling level — Ventilated loft

CD0046



This indicative guidance illustrates good practice for design and construction with respect to achieving thermal performance and air barrier continuity only. It must be implemented taking due regard of site conditions and all other requirements imposed by Building Regulations.

Calculated ψ-values for this detail

	Ceiling insulation thickness between 130 mm and 209 mm		Ceiling insulation thickness between 210 mm and 309 mm		Ceiling insulation thickness between 310 mm and 410 mm	
Solid wall block conductivity ($W \cdot m^{-1} \cdot K^{-1}$)	ψ-value ($W \cdot m^{-1} \cdot K^{-1}$)	Temperature factor	ψ-value ($W \cdot m^{-1} \cdot K^{-1}$)	Temperature factor	ψ-value ($W \cdot m^{-1} \cdot K^{-1}$)	Temperature factor
0.19	0.117	0.88	0.096	0.90	0.083	0.92
0.15	0.098	0.89	0.080	0.91	0.069	0.92
0.11	0.078	0.91	0.063	0.93	0.054	0.94

These values are valid for roof U values $\leq 0.20\ W \cdot m^{-2} \cdot K^{-1}$ and wall U values $\leq 0.30\ W \cdot m^{-2} \cdot K^{-1}$.

In all example calculations, external wall insulation fixings are stainless steel, 7 per m^2, diameter of 8 mm with 200 mm aircrete blocks.

Examples of constructions achieving these U values are:

Wall U values $\leq 0.30\ W \cdot m^{-2} \cdot K^{-1}$ can be achieved with:
— 95 mm $\leq$ insulation thickness $\leq$ 115 mm with $\lambda \leq 0.036\ W \cdot m^{-1} \cdot K^{-1}$

Wall U values $\leq 0.25\ W \cdot m^{-2} \cdot K^{-1}$ can be achieved with:
— 120 mm $\leq$ insulation thickness $\leq$ 150 mm with $\lambda \leq 0.036\ W \cdot m^{-1} \cdot K^{-1}$

Wall U values $\leq 0.20\ W \cdot m^{-2} \cdot K^{-1}$ can be achieved with:
— 160 mm minimum insulation thickness with $\lambda \leq 0.036\ W \cdot m^{-1} \cdot K^{-1}$.

Solid Externally Insulated Wall
Pitched Roof. Gable — Insulation at ceiling level — Ventilated loft

CD0046

Guidance checklist

Date: ..... Site manager/supervisor: .....

Site name: ..... Plot No: .....

Ref	Item	Yes/No Inspected (initials and date)
1	Is the ceiling insulation thickness between 130 mm and 410 mm?	☐ ☐ .....
2	Is the gap between the last joist and the gable wall filled with insulation?	☐ ☐ .....
3	Is the ceiling insulation conductivity 0.044 $W \cdot m^{-1} \cdot K^{-1}$ or less?	☐ ☐ .....
4	Is the external wall insulation installed tightly against the blocks with no gaps?	☐ ☐ .....
5	Is the continuity of the air barrier achieved? If not, please provide details.	☐ ☐ .....

Notes (include details of any corrective action)

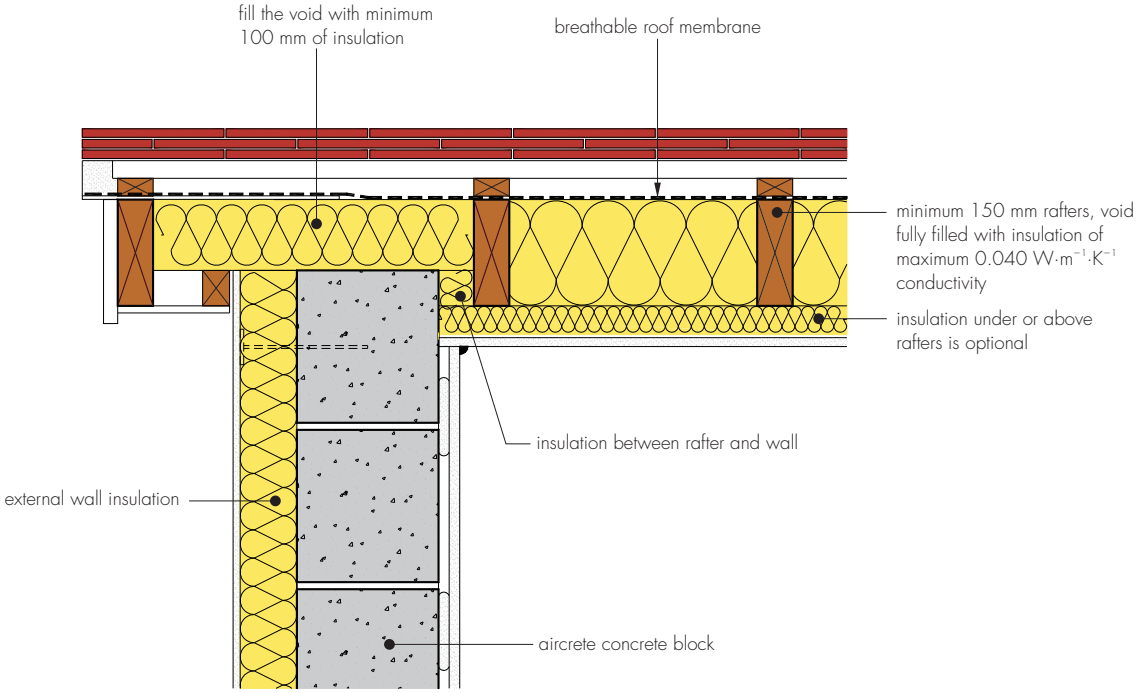
Constructive Details Ltd
Bucknalls Lane,
Watford
Hertfordshire WD25 9BA

t: + 44 (0)1923 665300
f: + 44 (0)1923 665301
e: enquiries@constructivedetails.co.uk
w: www.constructivedetails.co.uk

Solid Externally Insulated Wall

Pitched roof. Gable — Insulation at rafter level — Unventilated rafter void

CD0047



This indicative guidance illustrates good practice for design and construction with respect to achieving thermal performance and air barrier continuity only. It must be implemented taking due regard of site conditions and all other requirements imposed by Building Regulations.

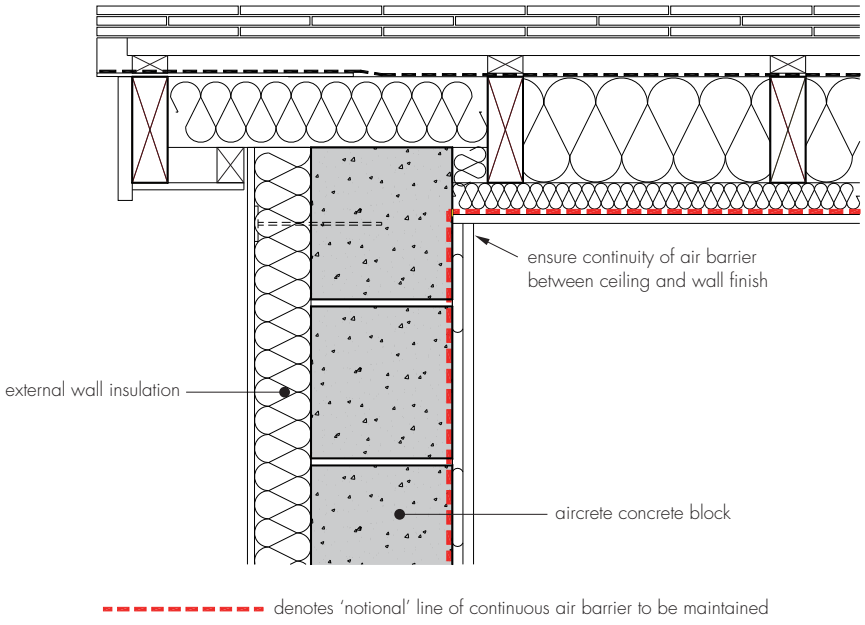
Notes

- fill the void between top of the gable and underside of breathable roof membrane with a minimum 100 mm of insulation with conductivity 0.040 $W \cdot m^{-1} \cdot K^{-1}$ or less. Also fill the gap between rafter and wall
- use a minimum 150 mm rafters, fully filled in between rafters with insulation with a maximum roof insulation conductivity of 0.040 $W \cdot m^{-1} \cdot K^{-1}$
- use a vapour control layer in the roof plasterboard if required by BS 5250 : 2011
- ensure continuity of the insulation throughout the junction leaving no gaps between wall insulation and roof insulation
- insulation under or above rafters (not shown in drawing) is optional
- ensure that the external wall insulation is installed correctly with no gaps
- seal between the ceiling and wall with either plaster, adhesive or flexible sealant
- other improved air barrier continuity solutions can be used.

Issued: 16 October 2013

Solid Externally Insulated Wall
Pitched roof. Gable — Insulation at rafter level — Unventilated rafter void

CD0047



This indicative guidance illustrates good practice for design and construction with respect to achieving thermal performance and air barrier continuity only. It must be implemented taking due regard of site conditions and all other requirements imposed by Building Regulations.

Calculated ψ-values for this detail

Solid wall block conductivity ($W \cdot m^{-1} \cdot K^{-1}$)	ψ-value ($W \cdot m^{-1} \cdot K^{-1}$)	Temperature factor
0.19	0.095	0.92
0.15	0.089	0.92
0.11	0.081	0.93

These values are valid for roof U values $\leqslant 0.20$ $W \cdot m^{-2} \cdot K^{-1}$ and wall U values $\leqslant 0.30$ $W \cdot m^{-2} \cdot K^{-1}$.

In all example calculations, external wall insulation fixings are stainless steel, 7 per m^2, diameter of 8 mm with 200 mm aircrete blocks.

Examples of constructions achieving these U values are:

Wall U values $\leqslant 0.30$ $W \cdot m^{-2} \cdot K^{-1}$ can be achieved with:
— 95 mm $\leqslant$ insulation thickness $\leqslant$ 115 mm with $\lambda \leqslant 0.036$ $W \cdot m^{-1} \cdot K^{-1}$

Wall U values $\leqslant 0.25$ $W \cdot m^{-2} \cdot K^{-1}$ can be achieved with:
— 120 mm $\leqslant$ insulation thickness $\leqslant$ 150 mm with $\lambda \leqslant 0.036$ $W \cdot m^{-1} \cdot K^{-1}$

Wall U values $\leqslant 0.20$ $W \cdot m^{-2} \cdot K^{-1}$ can be achieved with:
— 160 mm minimum insulation thickness with $\lambda \leqslant 0.036$ $W \cdot m^{-1} \cdot K^{-1}$.

Solid Externally Insulated Wall
Pitched roof. Gable — Insulation at rafter level — Unventilated rafter void

CD0047

Guidance checklist

Date: ..... Site manager/supervisor: .....

Site name: ..... Plot No: .....

Ref	Item	Yes/No Inspected (initials and date)
1	Is the void between top of the gable wall and underside of breathable roof membrane at least 100 mm and filled with insulation with conductivity 0.040 $W \cdot m^{-1} \cdot K^{-1}$ or less?	☐ ☐ .....
2	Is the gap between rafter and wall filled with insulation with conductivity 0.040 $W \cdot m^{-1} \cdot K^{-1}$ or less?	☐ ☐ .....
3	Is the roof insulation conductivity 0.040 $W \cdot m^{-1} \cdot K^{-1}$ or less between 150 mm minimum rafters?	☐ ☐ .....
4	Is the external wall insulation installed tightly against the blocks with no gaps?	☐ ☐ .....
5	Is the continuity of the air barrier achieved? If not, please provide details.	☐ ☐ .....

Notes (include details of any corrective action)

Constructive Details Ltd
Bucknalls Lane,
Watford
Hertfordshire WD25 9BA

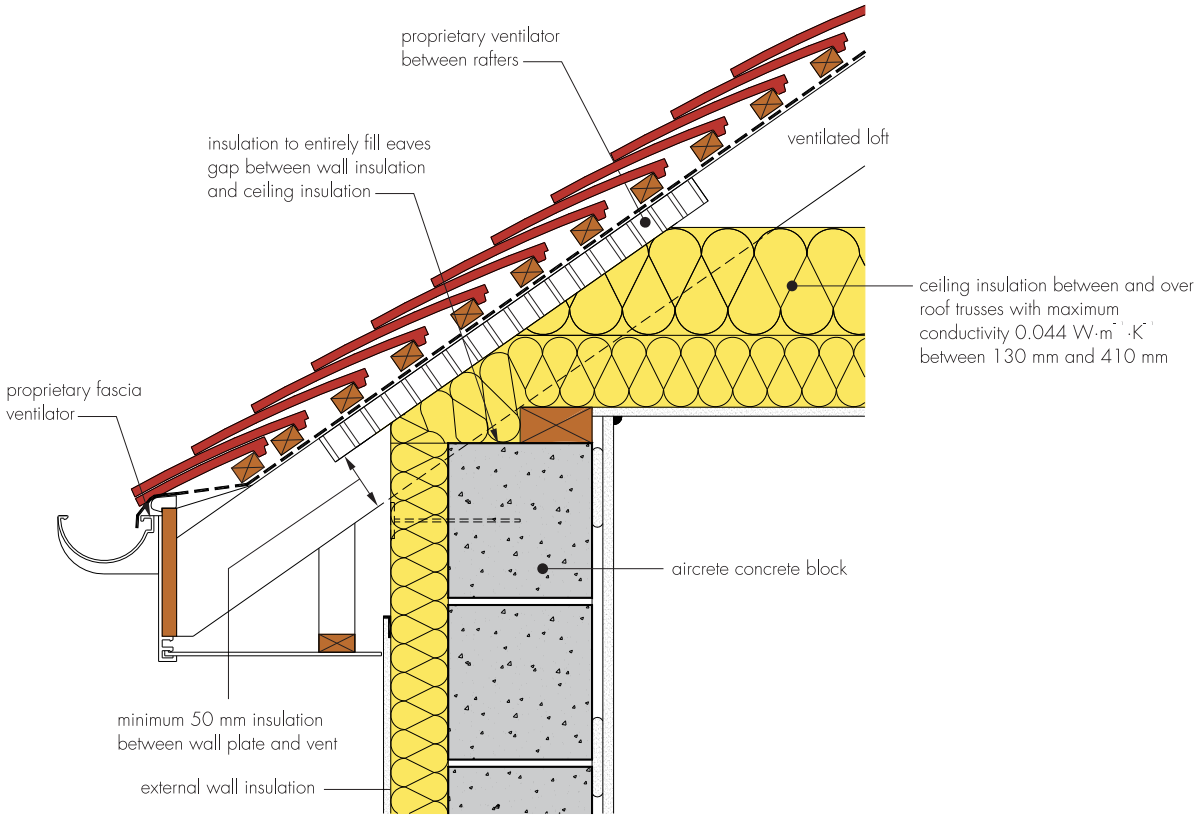
t: + 44 (0)1923 665300
f: + 44 (0)1923 665301

e: enquiries@constructivedetails.co.uk
w: www.constructivedetails.co.uk

Solid Externally Insulated Wall

Pitched roof. Eaves — Insulation at ceiling level — Ventilated loft

CD0048



This indicative guidance illustrates good practice for design and construction with respect to achieving thermal performance and air barrier continuity only. It must be implemented taking due regard of site conditions and all other requirements imposed by Building Regulations.

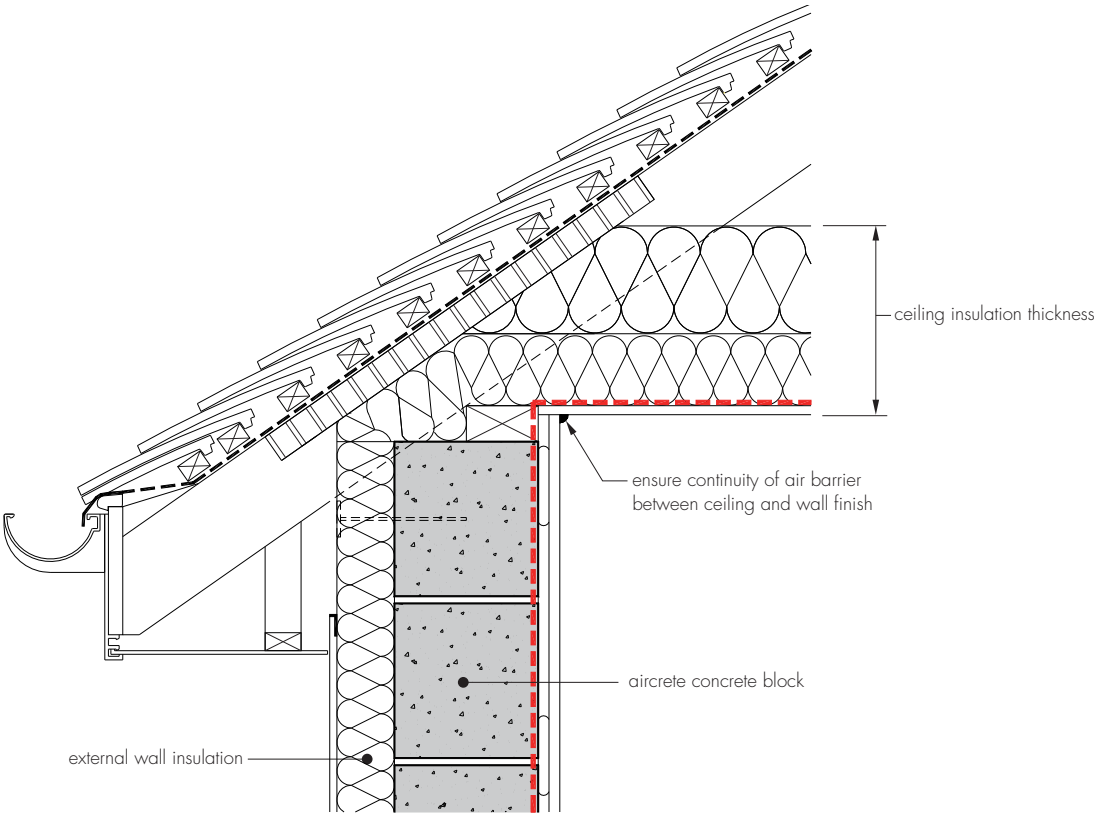
Notes

- ceiling insulation thickness between 130 mm and 410 mm
- maximum ceiling insulation conductivity 0.044 $W \cdot m^{-1} \cdot K^{-1}$
- minimum 50 mm gap between ventilator and wall plate filled with insulation
- insulation to entirely fill eaves gap between wall insulation and ceiling insulation
- ensure continuity of the insulation throughout the junction leaving no gaps between wall insulation and roof insulation
- ensure that the external wall insulation is installed tightly against the blocks with no gaps
- seal between the ceiling and the wall with either plaster, adhesive or flexible sealant
- other improved air barrier continuity solutions can be used.

Issued: 16 October 2013

Solid Externally Insulated Wall
Pitched roof. Eaves — Insulation at ceiling level — Ventilated loft

CD0048



denotes 'notional' line of continuous air barrier to be maintained

This indicative guidance illustrates good practice for design and construction with respect to achieving thermal performance and air barrier continuity only. It must be implemented taking due regard of site conditions and all other requirements imposed by Building Regulations.

Calculated ψ-values for this detail

Ceiling insulation thickness between 130 mm and 210 mm

	Wall U value less than or equal to 0.20 $W \cdot m^{-1} \cdot K^{-2}$		Wall U value between 0.21 and 0.25 $W \cdot m^{-1} \cdot K^{-2}$		Wall U value between 0.26 and 0.30 $W \cdot m^{-1} \cdot K^{-2}$	
Solid wall block conductivity ($W \cdot m^{-1} \cdot K^{-1}$)	ψ-value ($W \cdot m^{-1} \cdot K^{-1}$)	Temperature factor	ψ-value ($W \cdot m^{-1} \cdot K^{-1}$)	Temperature factor	ψ-value ($W \cdot m^{-1} \cdot K^{-1}$)	Temperature factor
0.19	0.131	0.92	0.110	0.91	0.101	0.91
0.15	0.121	0.91	0.100	0.91	0.092	0.91
0.11	0.108	0.91	0.089	0.91	0.081	0.91

Ceiling insulation thickness between 211 mm and 310 mm

	Wall U value less than or equal to 0.20 $W \cdot m^{-1} \cdot K^{-2}$		Wall U value between 0.21 and 0.25 $W \cdot m^{-1} \cdot K^{-2}$		Wall U value between 0.26 and 0.30 $W \cdot m^{-1} \cdot K^{-2}$	
Solid wall block conductivity ($W \cdot m^{-1} \cdot K^{-1}$)	ψ-value ($W \cdot m^{-1} \cdot K^{-1}$)	Temperature factor	ψ-value ($W \cdot m^{-1} \cdot K^{-1}$)	Temperature factor	ψ-value ($W \cdot m^{-1} \cdot K^{-1}$)	Temperature factor
0.19	0.151	0.92	0.129	0.91	0.121	0.91
0.15	0.141	0.91	0.120	0.91	0.112	0.91
0.11	0.129	0.91	0.108	0.91	0.100	0.91

Solid Externally Insulated Wall
Pitched roof. Eaves — Insulation at ceiling level — Ventilated loft

CD0048

Ceiling insulation thickness between 311 mm and 410 mm

	Wall U value less than or equal to 0.20 $W \cdot m^{-1} \cdot K^{-2}$		Wall U value between 0.21 and 0.25 $W \cdot m^{-1} \cdot K^{-2}$		Wall U value between 0.26 and 0.30 $W \cdot m^{-1} \cdot K^{-2}$	
Solid wall block conductivity ($W \cdot m^{-1} \cdot K^{-1}$)	ψ-value ($W \cdot m^{-1} \cdot K^{-1}$)	Temperature factor	ψ-value ($W \cdot m^{-1} \cdot K^{-1}$)	Temperature factor	ψ-value ($W \cdot m^{-1} \cdot K^{-1}$)	Temperature factor
0.19	0.168	0.92	0.147	0.91	0.138	0.91
0.15	0.158	0.91	0.138	0.91	0.129	0.91
0.11	0.146	0.91	0.126	0.91	0.118	0.91

These values are valid for roof U values $\leqslant 0.20$ $W \cdot m^{-2} \cdot K^{-1}$ and wall U values $\leqslant 0.30$ $W \cdot m^{-2} \cdot K^{-1}$.

In all example calculations, external wall insulation fixings are stainless steel, 7 per m^2, diameter of 8 mm with 200 mm aircrete blocks.

Examples of constructions achieving these U values are:

Wall U values $\leqslant 0.30$ $W \cdot m^{-2} \cdot K^{-1}$ can be achieved with:
— 95 mm $\leqslant$ insulation thickness $\leqslant$ 115 mm with $\lambda \leqslant 0.036$ $W \cdot m^{-1} \cdot K^{-1}$

Wall U values $\leqslant 0.25$ $W \cdot m^{-2} \cdot K^{-1}$ can be achieved with:
— 120 mm $\leqslant$ insulation thickness $\leqslant$ 150 mm with $\lambda \leqslant 0.036$ $W \cdot m^{-1} \cdot K^{-1}$

Wall U values $\leqslant 0.20$ $W \cdot m^{-2} \cdot K^{-1}$ can be achieved with:
— 160 mm minimum insulation thickness with $\lambda \leqslant 0.036$ $W \cdot m^{-1} \cdot K^{-1}$.

Solid Externally Insulated Wall
Pitched roof. Eaves — Insulation at ceiling level — Ventilated loft

CD0048

Guidance checklist

Date: ..... Site manager/supervisor: .....

Site name: ..... Plot No: .....

Ref	Item	Yes/No Inspected (initials and date)
1	Is the ceiling insulation thickness between 130 mm and 410 mm?	☐ ☐ .....
2	Is the ceiling insulation conductivity 0.044 $W \cdot m^{-1} \cdot K^{-1}$ or less?	☐ ☐ .....
3	Is there a minimum 50 mm gap between ventilator and wall plate filled with insulation?	☐ ☐ .....
4	Is the external wall insulation installed tightly against the blocks with no gaps?	☐ ☐ .....
5	Is the continuity of the air barrier achieved? If not, please provide details.	☐ ☐ .....

Notes (include details of any corrective action)

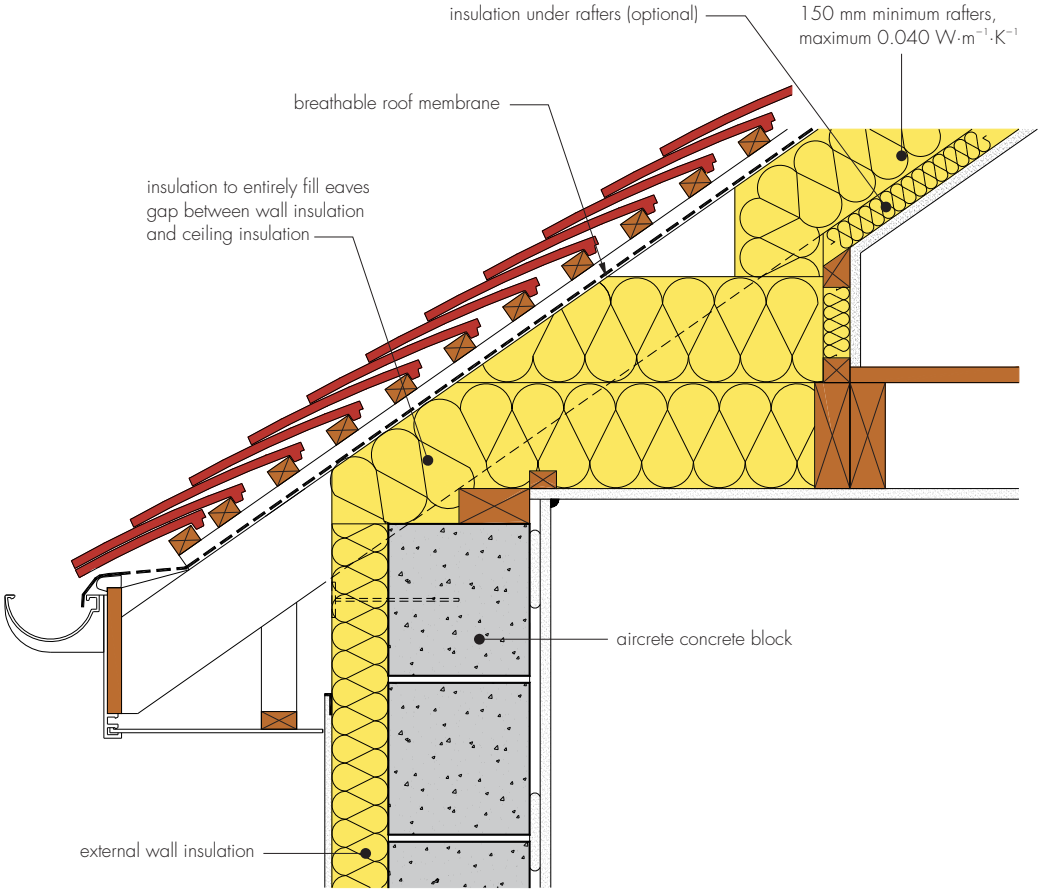
Constructive Details Ltd
Bucknalls Lane,
Watford
Hertfordshire WD25 9BA

t: + 44 (0)1923 665300
f: + 44 (0)1923 665301
e: enquiries@constructivedetails.co.uk
w: www.constructivedetails.co.uk

Solid Externally Insulated Wall

Pitched roof. Eaves — Insulation at rafter level — Unventilated rafter void

CD0049



This indicative guidance illustrates good practice for design and construction with respect to achieving thermal performance and air barrier continuity only. It must be implemented taking due regard of site conditions and all other requirements imposed by Building Regulations.

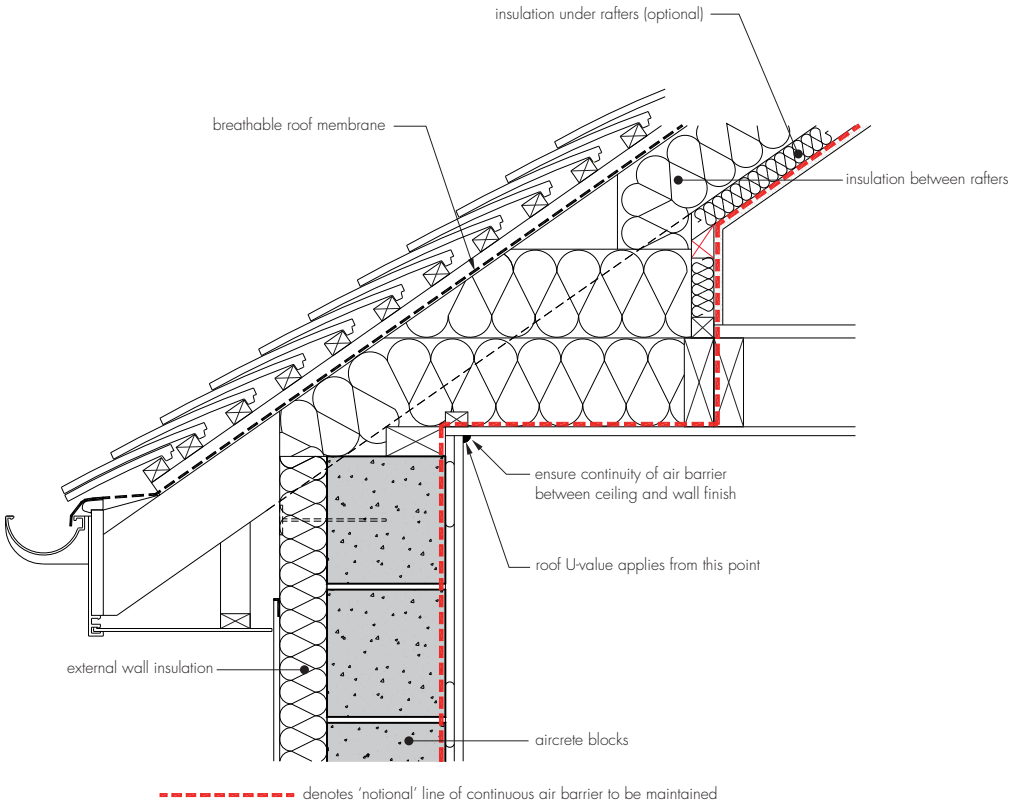
Notes

- use a minimum 150 mm rafters, fully filled between raftes with insulation with a maximum roof insulation conductivity of 0.040 $W \cdot m^{-1} \cdot K^{-1}$
- use a vapour control layer in the roof plasterboard if required by BS 5250 : 2011
- insulation under or above rafters (not shown in drawing) is optional
- insulation to entirely fill eaves gap between wall insulation and ceiling insulation
- ensure continuity of the insulation throughout the junction leaving no gaps between wall insulation and roof insulation
- ensure that the external wall insulation is installed tightly against the blocks with no gaps
- seal between the ceiling and wall with either plaster, adhesive or flexible sealant
- other improved air barrier continuity solutions can be used.

Issued: 16 October 2013

Solid Externally Insulated Wall
Pitched roof. Eaves — Insulation at rafter level — Unventilated rafter void

CD0049



This indicative guidance illustrates good practice for design and construction with respect to achieving thermal performance and air barrier continuity only. It must be implemented taking due regard of site conditions and all other requirements imposed by Building Regulations.

Calculated ψ-values for this detail

Calculated ψ-values for this detail

	Wall U value less than or equal to 0.20 $W \cdot m^{-1} \cdot K^{-2}$		Wall U value between 0.21 and 0.25 $W \cdot m^{-1} \cdot K^{-2}$		Wall U value between 0.26 and 0.30 $W \cdot m^{-1} \cdot K^{-2}$	
Solid wall block conductivity ($W \cdot m^{-1} \cdot K^{-1}$)	ψ-value ($W \cdot m^{-1} \cdot K^{-1}$)	Temperature factor	ψ-value ($W \cdot m^{-1} \cdot K^{-1}$)	Temperature factor	ψ-value ($W \cdot m^{-1} \cdot K^{-1}$)	Temperature factor
0.19	0.042	0.98	0.036	0.97	0.035	0.97
0.15	0.040	0.97	0.034	0.97	0.033	0.97
0.11	0.037	0.97	0.031	0.97	0.030	0.97

These values are valid for roof U values $\leqslant 0.20\ W \cdot m^{-2} \cdot K^{-1}$ and wall U values $\leqslant 0.30\ W \cdot m^{-2} \cdot K^{-1}$

In all example calculations, external wall insulation fixings are stainless steel, 7 per m^2, diameter of 8 mm with 200 mm aircrete blocks.

Examples of constructions achieving these U values are:

Wall U values $\leqslant 0.30\ W \cdot m^{-2} \cdot K^{-1}$ can be achieved with:
— 95 mm $\leqslant$ insulation thickness $\leqslant$ 115 mm with $\lambda \leqslant 0.036\ W \cdot m^{-1} \cdot K^{-1}$

Wall U values $\leqslant 0.25\ W \cdot m^{-2} \cdot K^{-1}$1 can be achieved with:
— 120 mm $\leqslant$ insulation thickness $\leqslant$ 150 mm with $\lambda \leqslant 0.036\ W \cdot m^{-1} \cdot K^{-1}$

Wall U values $\leqslant 0.20\ W \cdot m^{-2} \cdot K^{-1}$ can be achieved with:
— 160 mm minimum insulation thickness with $\lambda \leqslant 0.036\ W \cdot m^{-1} \cdot K^{-1}$.

Solid Externally Insulated Wall
Pitched roof. Eaves — Insulation at rafter level — Unventilated rafter void

CD0049

Guidance checklist

Date: ..... Site manager/supervisor: .....

Site name: ..... Plot No: .....

Ref	Item	Yes/No Inspected (initials and date)
1	Is the roof insulation conductivity 0.040 $W \cdot m^{-1} \cdot K^{-1}$ or less between 150 mm rafters?	☐ ☐ .....
2	Is the eaves gap entirely filled with insulation?	☐ ☐ .....
3	Is the external wall insulation installed tightly against the block with no gaps?	☐ ☐ .....
4	Is the continuity of the air barrier achieved? If not, please provide details.	☐ ☐ .....

Notes (include details of any corrective action)

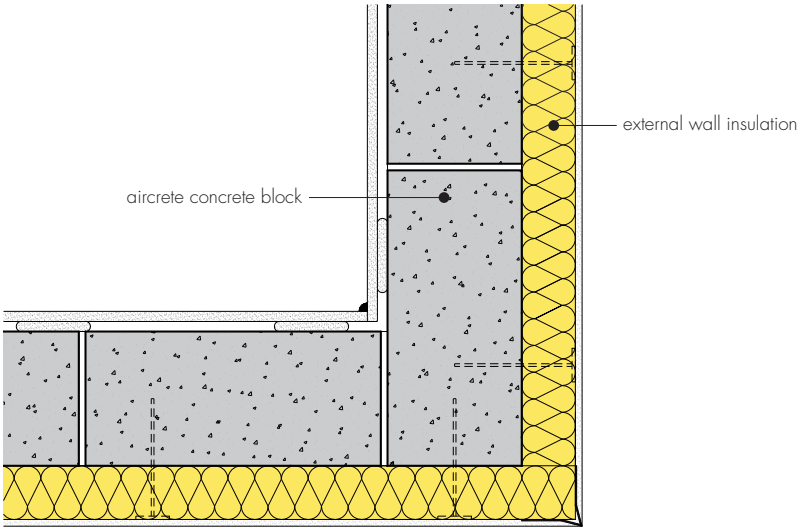
Constructive Details Ltd
Bucknalls Lane,
Watford
Hertfordshire WD25 9BA

t: + 44 (0)1923 665300
f: + 44 (0)1923 665301
e: enquiries@constructivedetails.co.uk
w: www.constructivedetails.co.uk

Solid Externally Insulated Wall

Normal corner

CD0050



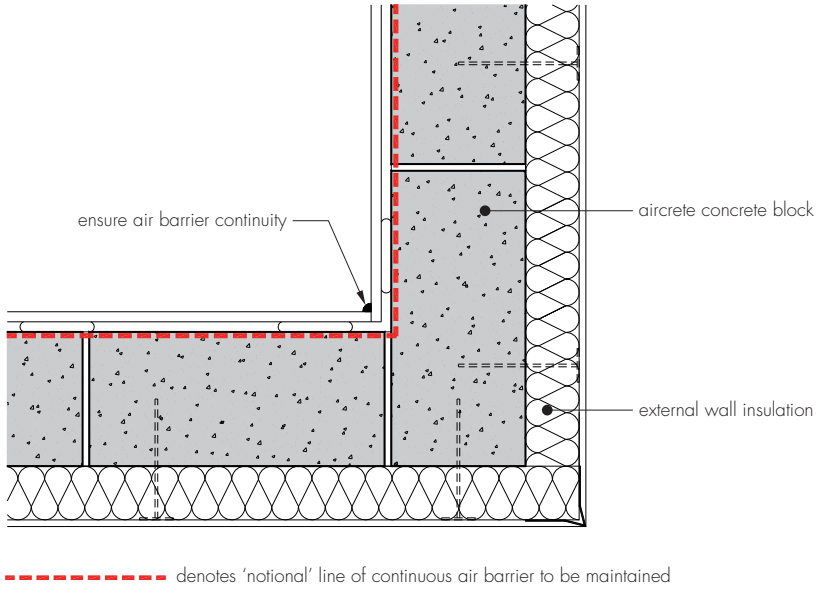
This indicative guidance illustrates good practice for design and construction with respect to achieving thermal performance and air barrier continuity only. It must be implemented taking due regard of site conditions and all other requirements imposed by Building Regulations.

Notes

- ensure that the external wall insulation is installed tightly against the blocks with no gaps
- ensure that all gaps are sealed.

Solid Externally Insulated Wall
Normal corner

CD0050



This indicative guidance illustrates good practice for design and construction with respect to achieving thermal performance and air barrier continuity only. It must be implemented taking due regard of site conditions and all other requirements imposed by Building Regulations.

Calculated ψ-values for this detail

	Wall U value less than or equal to 0.20 $W \cdot m^{-2} \cdot K^{-1}$		Wall U value between 0.21 and 0.25 $W \cdot m^{-2} \cdot K^{-1}$		Wall U value between 0.26 and 0.30 $W \cdot m^{-2} \cdot K^{-1}$	
Solid wall block conductivity ($W \cdot m^{-1} \cdot K^{-1}$)	ψ-value ($W \cdot m^{-1} \cdot K^{-1}$)	Temperature factor	ψ-value ($W \cdot m^{-1} \cdot K^{-1}$)	Temperature factor	ψ-value ($W \cdot m^{-1} \cdot K^{-1}$)	Temperature factor
0.19	0.070	0.92	0.076	0.91	0.081	0.90
0.15	0.063	0.93	0.067	0.92	0.072	0.90
0.11	0.054	0.93	0.057	0.91	0.059	0.90

These values are valid for wall U values $\leqslant 0.30\ W \cdot m^{-2} \cdot K^{-1}$.

In all example calculations, external wall insulation fixings are stainless steel, 7 per m^2, diameter of 8 mm with 200 mm aircrete blocks.

Examples of constructions achieving these U values are:

Wall U values $\leqslant 0.30\ W \cdot m^{-2} \cdot K^{-1}$ can be achieved with:
— 95 mm $\leqslant$ insulation thickness $\leqslant$ 115 mm with $\lambda \leqslant 0.036\ W \cdot m^{-1} \cdot K^{-1}$

Wall U values $\leqslant 0.25\ W \cdot m^{-2} \cdot K^{-1}$ can be achieved with:
— 120 mm $\leqslant$ insulation thickness $\leqslant$ 150 mm with $\lambda \leqslant 0.036\ W \cdot m^{-1} \cdot K^{-1}$

Wall U values $\leqslant 0.20\ W \cdot m^{-2} \cdot K^{-1}$ can be achieved with:
— 160 mm minimum insulation thickness with $\lambda \leqslant 0.036\ W \cdot m^{-1} \cdot K^{-1}$.

Solid Externally Insulated Wall
Normal corner

CD0050

Guidance checklist

Date: ..... Site manager/supervisor: .....

Site name: ..... Plot No: .....

Ref	Item	Yes/No Inspected (initials and date)
1	Is the external wall insulation installed tightly against the blocks with no gaps?	☐ ☐ .....
2	Is the continuity of the air barrier achieved? If not, please provide details.	☐ ☐ .....

Notes (include details of any corrective action)

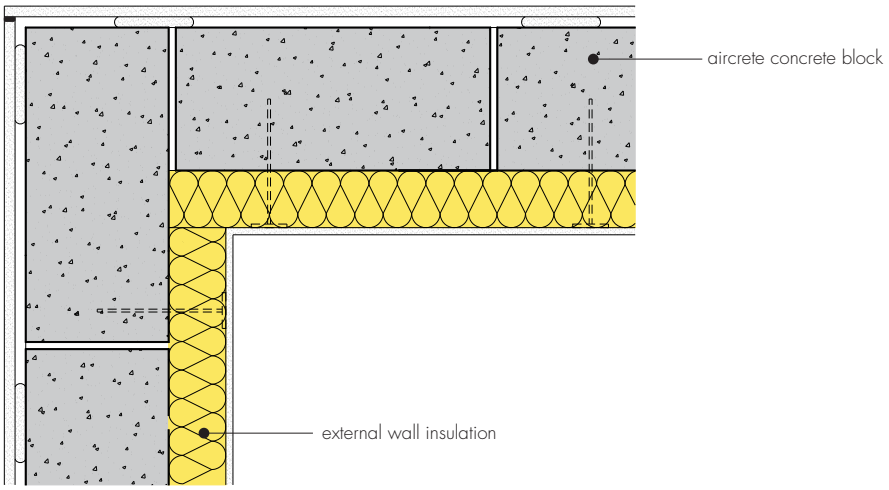
Constructive Details Ltd
Bucknalls Lane,
Watford
Hertfordshire WD25 9BA

t: + 44 (0)1923 665300
f: + 44 (0)1923 665301
e: enquiries@constructivedetails.co.uk
w: www.constructivedetails.co.uk

Solid Externally Insulated Wall

Inverted corner

CD0051



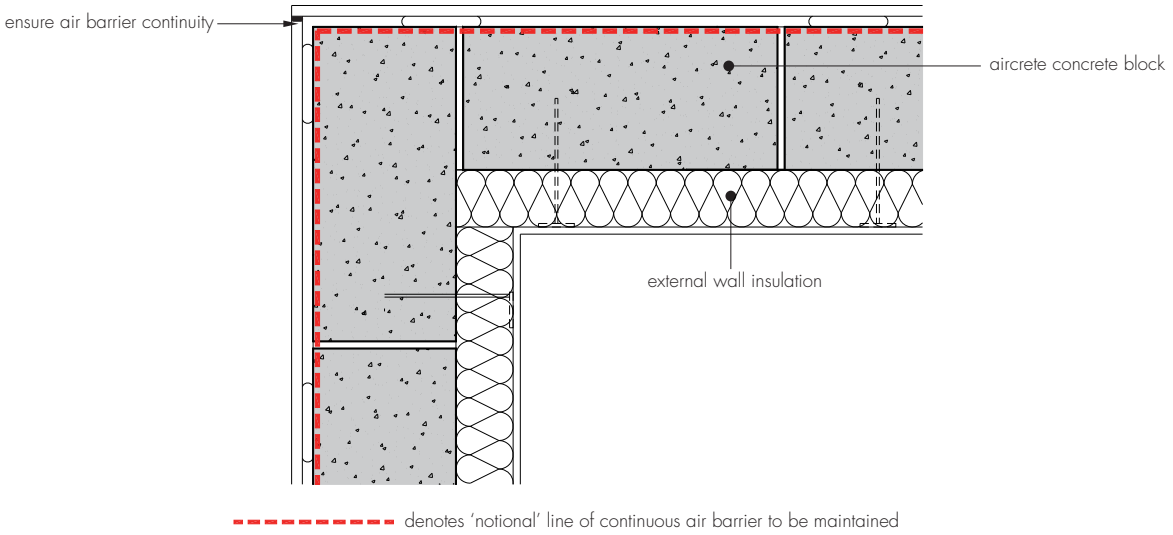
This indicative guidance illustrates good practice for design and construction with respect to achieving thermal performance and air barrier continuity only. It must be implemented taking due regard of site conditions and all other requirements imposed by Building Regulations.

Notes

- ensure that the external wall insulation is installed tightly against the blocks with no gaps
- ensure that all gaps are sealed.

Solid Externally Insulated Wall
Inverted corner

CD0051



This indicative guidance illustrates good practice for design and construction with respect to achieving thermal performance and air barrier continuity only. It must be implemented taking due regard of site conditions and all other requirements imposed by Building Regulations.

Calculated ψ-values for this detail

	Wall U value less than or equal to 0.20 W·m^{-2}·K^{-1}		Wall U value between 0.21 and 0.25 W·m^{-2}·K^{-1}		Wall U value between 0.26 and 0.30 W·m^{-2}·K^{-1}	
Solid wall block conductivity (W·m^{-1}·K^{-1})	ψ-value (W·m^{-1}·K^{-1})	Temperature factor	ψ-value (W·m^{-1}·K^{-1})	Temperature factor	ψ-value (W·m^{-1}·K^{-1})	Temperature factor
0.19	-0.067	0.99	-0.100	0.98	-0.117	0.97
0.15	-0.065	0.99	-0.097	0.98	-0.113	0.97
0.11	-0.063	0.98	-0.092	0.98	-0.106	0.97

These values are valid for wall U values ⩽ 0.30 W·m^{-2}·K^{-1}.

In all example calculations, external wall insulation fixings are stainless steel, 7 per m^2, diameter of 8 mm with 200 mm aircrete blocks.

Examples of constructions achieving these U values are:

Wall U values ⩽ 0.30 W·m^{-2}·K^{-1} can be achieved with:
— 95 mm ⩽ insulation thickness ⩽ 115 mm with λ ⩽ 0.036 W·m^{-1}·K^{-1}

Wall U values ⩽ 0.25 W·m^{-2}·K^{-1} can be achieved with:
— 120 mm ⩽ insulation thickness ⩽ 150 mm with λ ⩽ 0.036 W·m^{-1}·K^{-1}

Wall U values ⩽ 0.20 W·m^{-2}·K^{-1} can be achieved with:
— 160 mm minimum insulation thickness with λ ⩽ 0.036 W·m^{-1}·K^{-1}.

Solid Externally Insulated Wall
Inverted corner

CD0051

Guidance checklist

Date: ..... Site manager/supervisor: .....

Site name: ..... Plot No: .....

Ref	Item	Yes/No Inspected (initials and date)
1	Is the external wall insulation installed tightly against the blocks with no gaps?	☐ ☐ .....
2	Is the continuity of the air barrier achieved? If not, please provide details.	☐ ☐ .....

Notes (include details of any corrective action)

Constructive Details Ltd
Bucknalls Lane,
Watford
Hertfordshire WD25 9BA

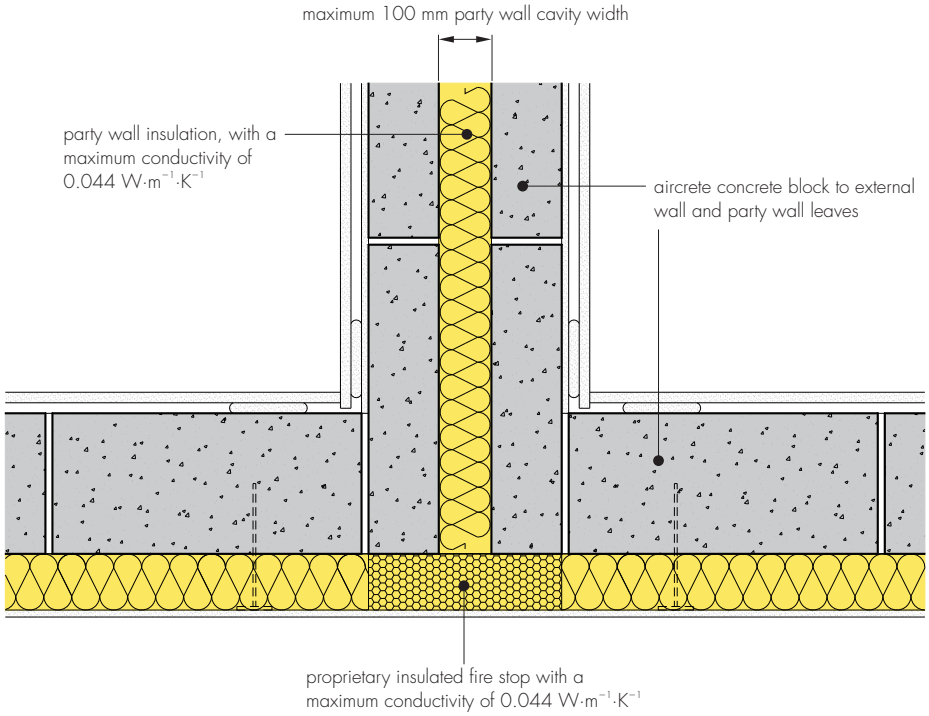
t: + 44 (0)1923 665300
f: + 44 (0)1923 665301

e: enquiries@constructivedetails.co.uk
w: www.constructivedetails.co.uk

Solid Externally Insulated Wall

Party wall between dwellings

CD0052



This indicative guidance illustrates good practice for design and construction with respect to achieving thermal performance and air barrier continuity only. It must be implemented taking due regard of site conditions and all other requirements imposed by Building Regulations.

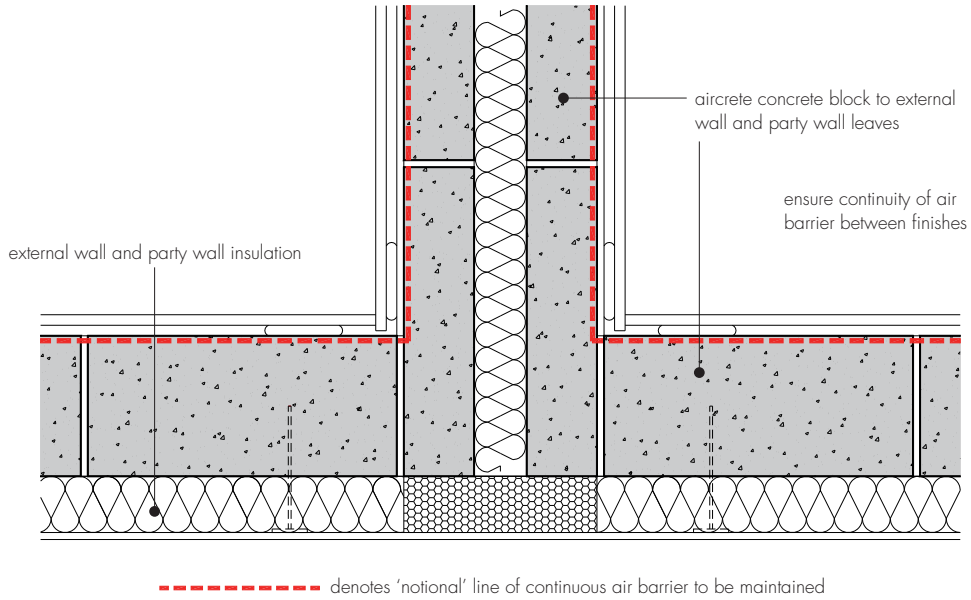
Notes

- party wall insulation with a maximum $\lambda = 0.044$ W·m^{-1}·K^{-1}
- maximum party wall cavity width of 100 mm
- fire stop is required only if external wall insulation is combustible
- ensure that the insulated fire stop has a maximum conductivity of 0.044 W·m^{-1}·K^{-1} and covers the full width of the abutting wall
- ensure continuity of the insulation throughout the junction leaving no gaps
- ensure that the external wall insulation and the full insulation is installed tightly against the blocks with no gaps
- ensure all gaps are sealed.

Issued: 16 October 2013

Solid Externally Insulated Wall
Party wall between dwellings

CD0052



This indicative guidance illustrates good practice for design and construction with respect to achieving thermal performance and air barrier continuity only. It must be implemented taking due regard of site conditions and all other requirements imposed by Building Regulations.

Calculated ψ-values — 140 mm party wall aircrete block conductivity of 0.19 W·m^{-1}·K^{-1}

	Wall U value less than or equal to 0.20 W·m^{-2}·K^{-1}		Wall U value between 0.21 and 0.25 W·m^{-2}·K^{-1}		Wall U value between 0.26 and 0.30 W·m^{-2}·K^{-1}	
Solid wall block conductivity (W·m^{-1}·K^{-1})	ψ-value (W·m^{-1}·K^{-1})	Temperature factor	ψ-value (W·m^{-1}·K^{-1})	Temperature factor	ψ-value (W·m^{-1}·K^{-1})	Temperature factor
0.19	0.057	0.95	0.065	0.94	0.072	0.93
0.15	0.057	0.95	0.066	0.94	0.074	0.93
0.11	0.060	0.94	0.069	0.93	0.078	0.92

The psi value is applied to each dwelling.

Calculated ψ-values — 140 mm party wall aircrete block conductivity of 0.15 W·m^{-1}·K^{-1}

	Wall U value less than or equal to 0.20 W·m^{-2}·K^{-1}		Wall U value between 0.21 and 0.25 W·m^{-2}·K^{-1}		Wall U value between 0.26 and 0.30 W·m^{-2}·K^{-1}	
Solid wall block conductivity (W·m^{-1}·K^{-1})	ψ-value (W·m^{-1}·K^{-1})	Temperature factor	ψ-value (W·m^{-1}·K^{-1})	Temperature factor	ψ-value (W·m^{-1}·K^{-1})	Temperature factor
0.19	0.053	0.95	0.060	0.94	0.066	0.93
0.15	0.053	0.95	0.060	0.94	0.066	0.93
0.11	0.055	0.95	0.062	0.93	0.068	0.93

The psi value is applied to each dwelling.

Solid Externally Insulated Wall
Party wall between dwellings

CD0052

Calculated ψ-values — 100 mm party wall aircrete block conductivity of 0.19 W·m^{-1}·K^{-1}

	Wall U value less than or equal to 0.20 W·m^{-2}·K^{-1}		Wall U value between 0.21 and 0.25 W·m^{-2}·K^{-1}		Wall U value between 0.26 and 0.30 W·m^{-2}·K^{-1}	
Solid wall block conductivity (W·m^{-1}·K^{-1})	ψ-value (W·m^{-1}·K^{-1})	Temperature factor	ψ-value (W·m^{-1}·K^{-1})	Temperature factor	ψ-value (W·m^{-1}·K^{-1})	Temperature factor
0.19	0.046	0.96	0.053	0.95	0.058	0.94
0.15	0.046	0.95	0.053	0.95	0.059	0.93
0.11	0.048	0.95	0.055	0.94	0.062	0.93

The psi value is applied to each dwelling.

Calculated ψ-values — 100 mm party wall aircrete block conductivity of 0.15 W·m^{-1}·K^{-1}

	Wall U value less than or equal to 0.20 W·m^{-2}·K^{-1}		Wall U value between 0.21 and 0.25 W·m^{-2}·K^{-1}		Wall U value between 0.26 and 0.30 W·m^{-2}·K^{-1}	
Solid wall block conductivity (W·m^{-1}·K^{-1})	ψ-value (W·m^{-1}·K^{-1})	Temperature factor	ψ-value (W·m^{-1}·K^{-1})	Temperature factor	ψ-value (W·m^{-1}·K^{-1})	Temperature factor
0.19	0.043	0.96	0.049	0.95	0.054	0.94
0.15	0.043	0.96	0.049	0.95	0.054	0.94
0.11	0.044	0.95	0.050	0.94	0.055	0.93

The psi value is applied to each dwelling.

These values are valid for wall U values ⩽ 0.30 W·m^{-2}·K^{-1}.

In all example calculations, external wall insulation fixings are stainless steel, 7 per m^2, diameter of 8 mm with 200 mm aircrete blocks.

Examples of constructions achieving these U values are:

Wall U values ⩽ 0.30 W·m^{-2}·K^{-1} can be achieved with:
— 95 mm ⩽ insulation thickness ⩽ 115 mm with λ ⩽ 0.036 W·m^{-1}·K^{-1}

Wall U values ⩽ 0.25 W·m^{-2}·K^{-1} can be achieved with:
— 120 mm ⩽ insulation thickness ⩽ 150 mm with λ ⩽ 0.036 W·m^{-1}·K^{-1}

Wall U values ⩽ 0.20 W·m^{-2}·K^{-1} can be achieved with:
— 160 mm minimum insulation thickness with λ ⩽ 0.036 W·m^{-1}·K^{-1}.

Solid Externally Insulated Wall
Party wall between dwellings

CD0052

Guidance checklist

Date: ..... Site manager/supervisor: .....

Site name: ..... Plot No: .....

Ref	Item	Yes/No Inspected (initials and date)
1	Is the party wall full fill insulation of 0.044 $W \cdot m^{-1} \cdot K^{-1}$ or less?	☐ ☐ .....
2	Is the party wall cavity width 100 mm or less?	☐ ☐ .....
3	Is the fire stop insulated with a material of 0.044 $W \cdot m^{-1} \cdot K^{-1}$ or less?	☐ ☐ .....
4	Is the fire stop covering the full width of the abutment wall?	☐ ☐ .....
5	Is the external wall insulation installed tightly against the blocks with no gaps?	☐ ☐ .....
6	Is the continuity of the air barrier achieved? If not, please provide details.	☐ ☐ .....

Notes (include details of any corrective action)

Constructive Details Ltd
Bucknalls Lane,
Watford
Hertfordshire WD25 9BA

t: + 44 (0)1923 665300
f: + 44 (0)1923 665301
e: enquiries@constructivedetails.co.uk
w: www.constructivedetails.co.uk