Benefits of H+H aircrete for separating walls

Benefits of H+H separating walls

H+H aircrete has been successfully used in cavity separating walls for many years, with their light weight and ease of handling making them the ideal choice for some builders. Whether built with traditional mortar or with our thin layer Celfix mortar, separating walls built using H+H aircrete blocks can easily meet and surpass Building Regulation requirements, with some approved details achieving the enhanced performances required for Code for Sustainable Homes or EcoHomes Credits.

Additional thermal benefits can also now be realised by using aircrete in separating walls to limit heat loss at junctions with external elements. When used in conjunction with aircrete inner leaves, heat losses at thermal bridges can be reduced by over 35%, enabling CO_2 emission targets to be more easily met or savings to be made on other parts of the insulated fabric without compromising the thermal performance of the dwelling.

Acoustic insulation

Although one would not normally associate light weight with acoustic performance, the close cellular structure of H+H aircrete, known for its benefits to thermal insulation, actually gives it excellent sound insulation properties relative to its weight. This has been borne out in recent years by its inclusion in many Robust Details which confirm, in most cases, an equivalent performance to walls built of denser materials. The relevant Robust Details are summarised in Table 1 below.

Table 1: Summary of Robust Details covering H+H aircrete separating walls

Robust Detail	Separating Wall Details 2 leaves of 100mm (min) Standard, High Strength or Super Strength grade				Credit Entitlement	
	Mortar joints	Cavity		Finishes	Code for Sustainable Homes	EcoHomes
		Width	Insulation			
E - WM - 6	Traditional mortar	75mm minimum	Clear cavity OR Fully insulated with mineral wool	Parge coat + 12.5mm plasterboard on dabs	1	3
E - WM - 10	Thin Joint	75mm minimum	Clear cavity OR Fully insulated with mineral wool	Parge coat + 12.5mm plasterboard on dabs	-	2
E - WM - 13	Thin Joint (Untied cavity)	75mm minimum	Clear cavity OR Fully insulated with mineral wool	Parge coat + 12.5mm plasterboard on dabs	3	4
E - WM - 15	Traditional mortar	75mm minimum	35mm Isover RD35	15mm plasterboard on dabs (No parge coat required)	1	3
E - WM - 23	Traditional mortar OR Thin Joint	100mm minimum	Fully insulated with Superglass Party Wall Roll	12.5mm plasterboard on dabs (No parge coat required)	3	4
E - WM - 24	Traditional mortar OR Thin Joint	100mm minimum	Fully insulated with Isover RD Party Wall Roll	12.5mm plasterboard on dabs (No parge coat required)	3	4
Flanking Wall Details applicable to all above separating walls 100mm (min) Solar, Standard, High Strength or Super Strength grade 12.5mm plasterboard on dabs or 13mm plaster finishes						

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Changes to Part L of the Building Regulations in 2010 drew attention to heat losses associated with party walls which had been previously ignored for regulatory purposes. This included heat channelled through clear cavities of separating walls (known as thermal by-pass) as well as heat losses at junctions with the external fabric of the dwelling (thermal bridges). Thermal by-pass can be eliminated by ensuring the cavities are filled with insulation and effective edge sealing is put in place. All of the previously clear cavity only Robust Details covering our products now permit a fully filled cavity, with the latest additions E-WM-23 and E-WM-24 providing an enhanced acoustic performance to enable 3 credits to be achieved under the Code for Sustainable Homes Health & Well Being section.

Thermal bridging

Thermal bridges exist where the separating wall breaks the continuity of external fabric insulation (eg at junctions with external walls, floors and roof). Additional heat losses associated with these thermal bridges are required to be accounted for in SAP, which in Appendix K gives a procedure based on a linear thermal transmittance value, Ψ (Greek letter Psi – pronounced "si").

The Ψ-value is a property of the thermal bridge junction and is the rate of heat flow per unit length of the thermal bridge. Table K1 of SAP gives values of Ψ applicable to different types of junctions detailed in accordance with the Accredited Construction Details (ACDs). Where ACDs are not used then even more onerous Default figures must be used. Alternatively, individual junctions can be assessed by a suitably qualified person to enable more beneficial values to be used.

Use of H+H aircrete can significantly reduce the thermal bridge effect at junctions as it will have a far better thermal resistance than denser concrete blocks (which were assumed when developing the ACDs). This was previously applied to external walls only but now that separating walls have to be considered for heat loss, further benefits in the dwelling heat loss can be realised. Table 2 below gives the Ψ-values for common party wall junctions taken from Table K1 (applicable to aggregate blockwork) together with calculated figures for H+H aircrete separating walls (taken from www.constructivedetails.co.uk).

Table 2: Ψ -values for common party wall junctions

Junction type	SAP Table K1			Calculated [1]
	Ref	Ψ (W/mK)		Ψ (W/mK)
		ACD	Default	
Party wall junction with external wall	**E18**	**0.06**	0.12	**0.038** [2]
Party wall junction with ground floor	**P1**	**0.08**	0.16	**0.043** [3]
Party wall junction with roof (insulated at ceiling level)	**P4**	**0.12**	0.24	**0.055** [4]

1. Separating wall consisting 2 x 100mm Standard grade blocks with fully filled cavity
2. Partially filled external wall with Standard grade inner leaf, U-value 0.25W/m²K (Contsructive Detail CD0016)
3. Beam & Celcon Standard grade block ground floor + 60mm PIR insulation and with Standard Grade Foundation Blocks (Contsructive Detail CD0017)
4. Ceiling insulated with 300mm mineral wool quilt (Contsructive Detail CD0020)

By comparing the calculated figures to the ACD values (it is unlikely that the even more onerous Default figures will be used in practice), it can be seen that heat losses associated with these junctions can be almost halved by using H+H Standard grade blocks in the separating walls.

Practical benefits

The additional heat loss at each junction is obtained by multiplying the linear length of the junction by the appropriate Ψ-value, the summation of which will give the total heat loss from the dwelling due to thermal bridging (H_{TB}), such that

$H_{TB} = \Sigma (L \cdot \Psi)$

This additional heat loss is then added to the other fabric heat losses in SAP to obtain a total heat loss for the dwelling. The thermal bridge heat losses are often referred to as a y-value, where

$y = H_{TB} / \Sigma (A_{exp})$

Put simply, the total thermal bridge heat losses are averaged out across the whole external fabric of the dwelling to enable easier comparison between different dwellings and dwelling types.

In order to illustrate the benefits of H+H aircrete on thermal bridging, Table 3 gives calculated y-values for a typical 2 storey 92m², attached dwelling in End and Mid Terrace formats. Party wall lengths are 8.3m and insulation levels are as given previously in Table 2.

Table 3: Calculated y-values

Dwelling type	Calculated y – value (W/m²K)		
	ACD all junctions	H+H external walls only	H+H party walls and external walls
End Terrace	0.091	0.059	0.054
Mid Terrace	0.115	0.079	0.066

Considering these house types, if all details for the new dwelling comply with the ACDs, then the additional heat losses due to non-repeating thermal bridges may be calculated in accordance with SAP, Appendix K equation K2:

$H_{TB} = y \cdot \Sigma (A_{exp})$, with y = 0.091 or 0.115 for end and mid terrace respectively

However, use of H+H Standard grade blocks for the inner leaves of the external walls can improve the y-value by over 30%. This will have the effect of significantly reducing the CO_2 emissions (a saving which is equivalent to reducing the U-values of every external element by over 0.03W/m²K). Alternatively, the designer has the flexibility to opt for more cost effective constructions with higher U-values whilst maintaining CO_2 emissions to meet regulatory requirements. The use of H+H aircrete blocks within the party walls will further reduce the y-value (and therefore thermal bridge heat losses) by 5.5% (or 8.5% for mid terrace) thus enabling further cost savings to be made without compromising the thermal performance of dwelling.

Further Information

To discuss the use of H+H aircrete in separating walls please contact our Technical Services Department via the contact details below. Alternatively, further information may be found on our datasheet “TSD57 Sound and Robust Details” which may be downloaded from our website www.hhcelcon.co.uk/downloads/technical-datasheets.

Ψ-values for all junctions (including separating walls) using H+H aircrete may be found on Constructive Details Limited website www.constructivedetails.co.uk. These currently cover partially filled external walls but are soon to be extended to cover fully filled external walls.

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