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 around 50%, 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. This reduction can be equivalent to the effect of adding 10-15mm of insulation to the external walls.

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	**0.041** [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 + 100mm PIR insulation and with Standard Grade Foundation Blocks (Contsructive Detail CD0017)
4. Ceiling insulated with 400mm 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

In order to illustrate the benefits of H+H aircrete separating walls on thermal bridging, Table 3 gives calculated fabric heat losses for typical attached dwellings in Semi-detached, End and Mid Terrace formats. Insulation levels are as given previously in Table 2.

Table 3: Heat loss from the dwelling fabric (W/K)

Dwelling type	Fabric only heat loss (excluding thermal bridges)	Additional heat losses due to thermal bridges – (% over fabric only)		
		ACD[1]	H+H external walls, aggregate party walls	H+H external walls, H+H party walls
Mid Terrace (3 bed, 74m²)	35.627	14.388 (40.4%)	10.260 (28.8%)	6.719 (18.9%)
End Terrace (3 bed, 74m²)	45.177	16.220 (35.9%)	8.887 (19.7%)	6.946 (15.4%)
Semi-detached (3 bed, 95m²)	59.769	19.883 (33.3%)	10.732 (18.0%)	9.386 (15.7%)

1. Default value used for Party wall / ground floor junction as ACD not available.

Considering these house types, if all details for the new dwelling comply with the ACDs, then heat losses due to non-repeating thermal bridges will be an additional 33.3 – 40.4% of the fabric only heat loss.

However, use of H+H Standard grade blocks for the inner leaves of the external walls can reduce the additional losses to under 20% for the end terrace and semi-detached and around 29% for the mid terrace. This can be further enhanced by the use of H+H aircrete blocks within the party walls as the thermal bridge heat losses can be further reduced to about 15.5% (or about 19% for the mid terrace). This will have the effect of significantly reducing the CO_2 emissions, meaning less reliance on renewables or other expensive solutions. Alternatively, the designer has the flexibility to opt for more cost effective fabric constructions with higher U-values whilst maintaining CO_2 emissions to meet regulatory requirements.

In practical terms, the reduction made to the Dwelling Emission Rate (DER) in SAP by converting from aggregate block party walls to H+H aircrete can be equivalent to that produced by improving the external wall U-values by around 0.02-0.03. For a typical semi-detached/end terrace dwelling requiring an external wall U-value of around 0.22 or 0.23W/m²K, this could result in a relaxation to 0.25W/m²K, representing a reduction of 10-15mm of high performance PIR insulation in the external wall. For lower U-values (eg 0.18W/m²K) the difference may be lower at around 0.01-0.02, but even at these levels, 10-15mm of insulation could still be required to make the difference.

If the same principle is applied to a mid-terrace unit then the figure is much greater, but this reflects the fact that the external wall area is small relative to the amount of party wall. However, as these types of unit are normally more difficult to satisfy Part L requirements (in comparison to the equivalent end terrace unit), they will benefit from the reduced CO_2 emissions resulting from the lower heat losses.

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 both partially and fully filled cavity external walls and fully filled separating walls.

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