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Sound

AIRCRETE PRODUCTS ASSOCIATION

Significant changes to Part E of the Building Regulations were introduced in July 2003 in order to improve in practice the standards of sound insulation between and within individual dwellings and in flats and apartments.

Aircrete's intrinsic acoustic efficiency makes it a particularly appropriate material to use for internal and external walls in order to comply with these requirements.

Many builders prefer to have just one type of concrete block on site, a practice that offers convenience, ease of use and efficiency. The use of aircrete for separating walls, flanking walls and internal walls in dwellings can meet the requirements of Part L (thermal insulation), as well as those for Part E detailed here.

Conformity to Part E and robust details for England and Wales

The main considerations in Part E are:

E1 Protection against sound from other parts of the building and adjoining buildings.

This deals with the performance aspects of separating walls and floors.

E2 Protection against sound within a dwelling - walls and floors.

This deals with the performance aspects of internal walls and floors.

There are two other conditions, E3 and E4, which cover reverberation in communal areas and acoustic control in schools. For guidance on acoustic design of schools more information can be found in Building Bulletin 93 available from **www.gov.uk.**

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Methods of compliance

There are several ways in which compliance with the requirements of Regulation E1 may be demonstrated:-

Regulation E1 - Separating Walls and Floors

The Approved Document supporting Part E sets out the performance standards that separating walls and floors should attain. These requirements can be met by essentially two alternative methods:

1. Adopting recommended constructions given in AD-E and carrying out Pre-Construction Testing (PCT)

A number of separating wall and floor constructions are described in Approved Document E (2003 edition) which, if built correctly, will conform to the performance standards. However, these elements will require site testing of at least 1 in 10 dwellings.

The details given in the Approved Document are not exhaustive and the use of alternative constructions is permitted, but these will also be subject to site testing. For further information on suitable solutions using aircrete blocks, please contact an APA manufacturer or refer to their website.

2. Adopting Accredited Robust Details that do not require PCT

Robust Details are construction solutions that provide an alternative to PCT as a method of complying. A Robust Detail, for Part E of the Building Regulations, is a separating wall or floor construction and associated flanking constructions that has been assessed and approved by Robust Details Ltd (RDL).

In order to be approved, each Robust Detail must:

- Be capable of consistently exceeding the performance standards given in Approved Document E by a significant margin of 5dB
- Be practical to construct on site
- Accommodate acceptable variations in workmanship

To design or build using Robust Details, the wall or floor specification must be selected from the Robust Details handbook obtained from Robust Details Limited. A copy can be obtained through: **www.robustdetails.com/the-handbook**

In order to use a Robust Detail as an alternative to PCT, the developer is required to:

- Register each plot with Robust Details Ltd
- Give the building control body a Robust Detail purchase statement relating to the plot(s) before work starts
- Construct separating walls and separating floors strictly in accordance with the relevant Robust Detail

Once RDL have received a completed registration form and payment a unique registration number will be allocated along with:

- A purchase statement which will include the unique plot registration number(s). This purchase statement should be passed to the Building Control body (Local Authority or Approved Inspector) before starting building work on the plot(s)
- A copy of the checklist for each Robust Detail
- A compliance certificate for each plot ready for authorisation once work has been completed, which is then forwarded to Building Control

There are now a significant number of Robust Detail constructions for aircrete separating and flanking walls. Details are constantly being updated and improved upon. The constructions include cavity separating walls in traditional mortars, thin layer mortars, part and full fill cavities and parged blockwork. The flanking walls to the aircrete separating walls are of aircrete. In the case of thin layer mortar constructions there are options of untied and tied cavity separating walls. For tied thin joint, specific wall ties have been assessed that have been designed for both structural and acoustic requirements.

Flanking walls to non aircrete robust details separating walls are also included as part of Robust Detail constructions. 100mm(min) 450-800kg/m^3 aircrete (thin joint or traditional) can also be used as flanking walls with a range of non aircrete Robust Details separating walls, as shown in the Robust Details manual.

For further information on the currently approved details refer to the Robust Details Ltd website at **www.robustdetails.com**

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Regulation E2 - Internal Walls and Floors

Internal walls between bedrooms or WCs and other rooms and internal floors are also required, under Regulation E2, to meet a specified performance standard set out in the Approved Document.
These elements will not require site testing as they may be either constructed to provide a specified weight per m^2, or certified by the manufacturer providing laboratory evidence supporting their performance.

The following table summarises the main requirements with Part E for internal and separating walls and floors and indicates possible solutions.

Structural element	Performance requirement		Solution	PCT Required
	Airborne DnTw +Ctr	Impact LnTw		
Dwellings				
Separating walls	Min 45dB		1. See Robust Details Ltd website for approved cavity wall solutions using 2 leaves of 100mm aircrete masonry in both traditional and thin layer mortar 2. Use an Approved Document construction (e.g. Type 2.3 or 2.4 constructions) or alternative method (Refer to APA manufacturer for details)	No Yes
Internal partitions *	Rw = 40dB		Typically, 100mm aircrete (450-800kg/m^3) with plaster or dry lined finish (Refer to APA manufacturer for full details)	
Internal floors**	Rw = 40dB		Typically, 150mm beams with 100mm aircrete infill flooring blocks (Refer to APA manufacturer for full details)	
Rooms for residential purposes***			**Robust details do not apply**	
Separating walls	Min 43dB		All of the above aircrete constructions can be used but will require PCT. (Refer to APA manufacturer for full details)	Yes
Separating floors	Min 45dB	Max 62dB		
Internal walls	Rw = 40dB		Typically, 100mm aircrete (450-800kg/m^3) with plaster or dry lined finish (Refer to APA manufacturer for full details)	No
Internal walls	Rw = 40dB		Typically, 150mm beams with 100mm aircrete infill flooring blocks (Refer to APA manufacturer for full details)	

* Refers to walls between a bedroom or a room containing a WC
** Refers to the entire floor between two storeys in a dwelling
*** Any of the Approved Document constructions mentioned above may be used but these will still be subject to site testing

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Flats and apartments

Aircrete masonry can be used in the both the separating wall and flanking walls to floors in flats and apartments. There are now a significant number of separating floor types that have been assessed by Robust Details Ltd. The numbers of these continue to grow, especially of concrete construction. There are both generic and proprietary floor types. The type of flanking wall that can be used in combination with the floors also vary. 100mm aircrete masonry can be used with many of these without requiring PCT and certain floor types may also require higher density aircrete units, which usually coincide with the requirement for higher compressive strengths of masonry units. With some combinations of floors and aircrete walls, it is possible that only the separating floor requires PCT, whilst any aircrete separating wall can be registered as a Robust Detail construction. The latest assessments and approvals can be found on the RDL website at **www.robustdetails.com**

Compatibility with Approved Document L

The Building Regulations for Part L changed in 2010 and introduced the whole issue of thermal loss via the separating party walls. Contrary to previous assumptions, a limited amount of site testing work has shown that cavity party walls may not be calculated at zero heat loss. This is because airflow in an empty cavity provides a heat loss mechanism, with the heat assumed to enter the cavity and then flow upwards and outwards to be lost to the surrounding air.

Some guidance is given in the Approved Document L1A for U-values of party walls as follows:

- Solid wall – U-value of 0.0W/m^2.K
- An unfilled cavity with no effective edge sealing – U-value 0.50W/m^2.K
- An unfilled cavity with effective sealing around all exposed edges and in line with insulation layers in abutting elements – U-value 0.20W/m^2.K
- A fully filled cavity with effective sealing around all exposed edges and in line with insulation layers in abutting elements – U-value 0.0W/m^2.K

Therefore, in reality cavity party walls will require insulation.

The Building Control Alliance (**www.buildingcontrolalliance.org**) has published agreed industry definitions for both the meaning of 'fully filled' and 'effective edge sealing'.

There are aircrete solutions to meet Part L requirements to have fully filled/edge sealed separating party walls with zero U-values, whilst maintaining acoustic performance under the Robust Details Ltd scheme. These solutions include the addition of mineral wool in the form of rolls, batts or blown wool with a maximum density of 40kg/m^3, which can be added to existing aircrete Robust Details whether in conventional or thin layer mortar.

Aircrete separating walls will also reduce the heat losses at the junctions with the roof, ground floor and external walls. The use of aircrete construction details can result in significantly lower psi and y-values, generally half of the default values that are used in SAP assessments. Two sets of thermal bridging details are available. The first, through LABC, sets out specific thicknesses and thermal conductivity values for the materials used in the construction, optimizing the benefit of thermal bridging. The second, through Constructive Details Limited, gives a broader range of U-values and hence is slightly more flexible.

Both sets of details are available through the following links:

www.labc.co.uk/registration-schemes/construction-details
www.constructivedetails.co.uk/resources/

For more information

This publication is only intended to be an outline guide to aircrete products. You are advised to contact respective APA members for more comprehensive technical support and guidance, and extensive technical literature covering every aspect of designing and working with aircrete products.

H+H UK Limited
Celcon House, Ightham
Sevenoaks, Kent, TN15 9HZ
www.hhcelcon.co.uk
t: 01732 886444
f: 01732 887013
e: technical.services@celcon.co.uk

Forterra Building Products
5 Grange Park Court
Roman Way
Northampton, NN4 5EA
t: 03705 626500
e: thermalitesales@forterra.co.uk

Quinn Building Products
235 Ballyconnell Road, Derrylin,
Co. Fermanagh Northern Ireland, BT92 9GP
www.quinn-buildingproducts.com
t: 02867 748866
f: 02867 748800
e: info@quinn-buildingproducts.com

Thomas Armstrong (Concrete Blocks) Ltd
Bridge Road, Brompton-on-Swale
Richmond, North Yorkshire, DL10 7HW
www.thomasarmstrong.co.uk
t: 01748 810204
f: 01748 813950
e: airtec@thomasarmstrong.co.uk

Tarmac Building Products
i10 Building
Railway Drive
Wolverhampton, WV1 1LH
www.tarmac.com
t: 0345 606 2468
e: blocks@tarmacbp.co.uk