

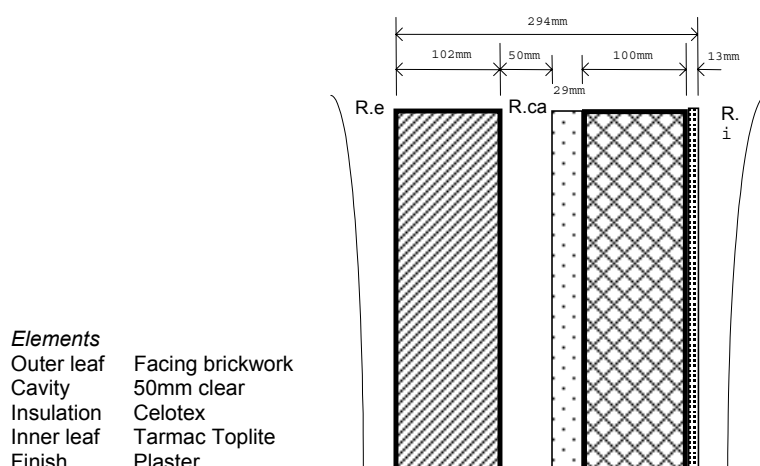
APPENDIX 3.3
(referred to in paragraph 3.86)

Example of a U-value calculation

In this appendix, we set out an example of a U-value calculation. A typical part-filled cavity wall is shown in Figure 1.

FIGURE 1

Example wall section



The thermal conductivity values of materials (in W/mK) are assumed to be:

Materials	W/mK
Facing brickwork	0.840
Celotex	0.019
Tarmac Toplite	0.150
Lightweight plaster	0.013

The total resistance is calculated from the elements as thicknesses divided by thermal conductivity. This gives:

External surface resistance (R.e)	0.06
Facing brickwork	0.12
Cavity (R.cav)	0.44
Celotex CW2029	1.53
Tarmac Toplite	0.67
Plaster	0.07
Internal surface resistance (R.i)	0.12
Total resistance of the wall	3.01

The U-value of the wall is then given by:

$$U = 1/\text{Total resistance} = 1/3.01 = 0.33 \text{ W/m}^2\text{K}$$

The above example illustrates the principal behind U-Value calculations of wall sections which applies to all methods of compliance. This example is a simplified calculation and does not take into account:

- mortar joints within the brickwork;
- mortar joints within the blockwork;
- the air gaps between the insulation board and the blockwork surface; and
- thermal bridging of the wall ties.

The Building Regulations Part L (England & Wales) and Part J (Scotland) require that U-values be calculated to European standards including BS EN ISO 6946. As manual calculations are unlikely to be practical, software has been developed by BRE and the building materials industry through a DTLR-funded project. The software is the reference calculation method and is available via <http://projects.bre.co.uk/uvalues/>.